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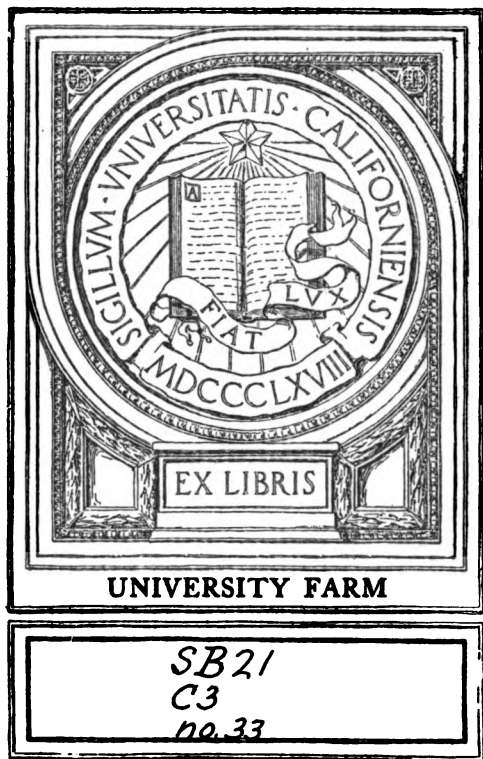
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Thirty-Third Fruit-Growers' Convention

HELD AT MARYSVILLE
DECEMBER 3-6, 1907



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**THIRTY-FIRST
FRUIT-GROWERS'
CONVENTION
OF CALIFORNIA**

HELD AT SANTA ROSA, CAL.,

DECEMBER 5-8, 1905.

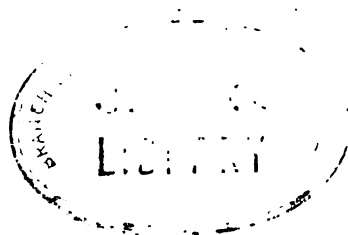
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OFFICIAL REPORT
OF THE
THIRTY-THIRD FRUIT-GROWERS'
CONVENTION

OF THE
STATE OF CALIFORNIA.

**HELD UNDER THE AUSPICES OF THE STATE COMMISSION OF HORTI-
CULTURE AT MARYSVILLE, COMMENCING TUESDAY, DECEMBER
3, AND ENDING FRIDAY, DECEMBER 6, 1907.**



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CALIFORNIA STATE COMMISSION OF HORTICULTURE.

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OFFICE:

STATE CAPITOL, SACRAMENTO.

BRANCH OFFICE, ROOM 11, FERRY BUILDING, SAN FRANCISCO.

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SYNOPSIS OF THE PROCEEDINGS
OF THE
THIRTY-THIRD CALIFORNIA FRUIT-GROWERS' CONVENTION
HELD UNDER THE AUSPICES OF THE
STATE COMMISSION OF HORTICULTURE, AT MARYSVILLE,
DECEMBER 3, 4, 5, AND 6, 1907:

TUESDAY, December 3, 1907.

Pursuant to call, the Convention met in the Presbyterian Church, Marysville, Cal., at 9:30 o'clock A. M.

The Convention was called to order by President J. W. JEFFREY, State Commissioner of Horticulture.

MR. JOHN ISAAC acted as Secretary.

REV. W. S. WILSON, of Marysville, opened the proceedings with prayer.

ADDRESS OF WELCOME.

BY G. W. HALL, MAYOR OF MARYSVILLE.

Mr. President, Members of the California Fruit-Growers' Convention, Ladies and Gentlemen: That passage of Scripture which reads, "By their fruits ye shall know them," to my mind is applicable to this occasion. I take it that many of the delegates and friends of horticulture at this meeting are visiting our city for the first time, but you are not unknown to us; you are not strangers in a strange place, for by your fruits we have known you.

We welcome you to this city—you, the representatives of the greatest industry in the State of California. You have developed, during the last quarter of a century, not only the greatest fruit-growing State in the Union, but the greatest fruit-producing area of the entire world. On behalf of the city of Marysville and of Sutter and Yuba counties, I extend to you a very cordial welcome to our city, the hub of the Sacramento Valley. We appreciate the fact that your Convention is so representative, so strong, as to attract to our city His Excellency, the Governor of the State of California, and to him I extend a most cordial greeting in behalf of the city which I have the honor to represent.

During your stay, while visiting our city, you will notice the white-washed stumps of what were once beautiful orange trees, and you will, no doubt, appreciate the sacrifice which the property-holders of this city made for the fruit interests of this State. Yuba County has a live, wide-awake Horticultural Commission, and one of its keen-eyed commissioners discovered the white fly and warned the people of the city that the pest was a menace to the fruit industry of the State. The people backed up the commission, and it resulted in cutting down and defoliating in the vicinity of eight hundred trees, at an expense of \$4,500 to the people of this city.

We appreciate very much the compliment this Convention has paid our city, and I trust the results of your labors will benefit your organization, and also that you will enjoy every moment of your visit to our city. I thank you. (Applause.)

THE CHAIRMAN. I am sure we appreciate the Mayor's remarks, and Governor Gillett will now further that appreciation in an address to us. (Applause.)

ADDRESS BY GOVERNOR J. N. GILLETT.

Fellow Citizens: It is a pleasure for me to be with you opening this Convention. I have been expecting to make a trip into this section of the country for some time, but have been rather busy, and this is the first opportunity I have had, and this only for a short time. I came, not only to be present with you for a short time to-day, but also to take a trip down the river to see what improvements might be made by the State to save this city and the surrounding country from the dangers that almost annually threaten it by reason of flood waters.

As was said by the Mayor, the fruit industry of this State is one of the great industries—in fact, the greatest—and as time rolls on and our population increases it will continue to grow greater until it will be one of the great interests of the world. It is a business that requires a great deal of study and a great deal of thought and a great deal of protection, and it is just such conventions as this that will bring about the results which are necessary to keep this great industry fully alive and to have it accomplish that which we all hope for it.

I noticed the stumps as I came into Marysville. That was the very first thing I looked for. I remember when the word first came to me that the white fly had been discovered in Marysville, and appreciated how dangerous it would be if that fly should spread, and I was pleased to know the willingness with which the people of Marysville took down their ornamental trees and destroyed their grounds—and it was almost like a man destroying his household idols, and that for the purpose of

protecting one of the big industries of this State—and I want to thank the people of this city for the work which they did. They showed the right spirit, and the people of the State will appreciate what was done in Marysville and the energetic manner in which the war was carried on against this pest, which, if it spreads, will do injury to the whole State to an extent that we can not contemplate.

As I said, there are a great many things for the people to give thought to and study out. You have got to be wide awake all the time, and I know you are. The Horticultural Commissions of the State and of the different counties must pull together in harmony, for you are all working for one common end. This State of ours, with its climate and its soil, is peculiarly adapted to fruit growing, and there is no reason why we can not supply the entire country with its fruits, green and dried, and we are going to do it and are doing it to-day. But there are several things which we have got to take hold of and which are of vast importance to us in bringing about the desired results.

One of the great problems to-day confronting California is the transportation question. If you are going to make your fruit industry a success you must have the best, the cheapest, and the quickest transportation. You must be able to get your fruit to the markets of the East in the best and quickest way possible, and that is something that is going to take a good deal of time. But I am satisfied that, if you stand together, if you make a united effort, this thing will finally be settled and we can get our fruit to these markets a great deal faster and a great deal cheaper than we are getting it now. I believe the building of the Panama canal will be one of the great factors in settling this question. Of course, one road can not very well carry the great amount of fruit that is produced in our orchards, but we will have three—the Western Pacific, the Santa Fé, and the Southern Pacific. With proper car equipment and with fast trains, these railroads ought to be able to handle the fruit of this State and handle it quickly, and get it to the East quickly, and that is what we want—to get it there as soon as possible and at a rate that is reasonable and fair and just; and as soon as the canal is completed, which I think will be in ten years, possibly a little longer, there will then be another means of transportation by which we can get our fruits to Europe and along the Atlantic coast cheap, and that will tend to bring down rates to this coast. So the question of transportation is one on which the people must be continually at work to see that rates are reasonable and that cars are supplied, so that when we grow our fruit it does not rot on our hands or on some side track, but that it reaches the great cities of the country in splendid condition and where it can be sold for a fair price.

There is another thing in which it seems to me our State ought to take an interest, and that is the advancement of horticulture and agriculture through our colleges, our University, and Agricultural farms. Our boys ought to be educated along those lines, because if horticulture and viticulture, for instance, are going to be great industries of our State—and they are great industries to-day—it is important that our boys should be educated along those lines. It is an immense question and we ought to take hold of it in our universities with a great deal of vigor. We have a farm at Davisville, we also have a large property at Fresno—the Kearney estate—and I hope the State will be generous in its appropriations to make those farms a success, and do everything it can to develop the horticultural and viticultural interests of our State, because I know of nothing else we can teach our youth which will be of greater advantage to them in the future than education along these lines.

I said I was pleased to be with you to-day. I did not expect to make much of an address when I came here—only to state to you that I feel an interest, as I pass through our State, in the large fruit orchards that I see on every hand. I realize the great importance of your industry. I know that it is the wealth of our State. It means the bringing here in the future of a great many people. What we want in California is intensified farming. The time is coming when these great ranches must be broken up and we must look more to irrigation and to small farming, the raising of fruits and vegetables, and that is what is going to make our State a great State. Provide a water supply that is inexhaustible. It seems to me that if man had devised a plan for making a great valley which could be irrigated nicely, he could not have improved on the Sacramento and San Joaquin valleys. There is everything that you need—a good soil, an abundance of water, and splendid sunshine—everything that is necessary to grow fruit to perfection. All these things we have in the Sacramento and San Joaquin valleys, and I know as time rolls on and our population increases and these great questions of reclamation and irrigation are solved and people come among us to make their homes here, we will find in this valley and around Marysville and above and around Chico—in fact, all up and down where fruit can be grown—a large population consisting of happy people and fine cities. Marysville may be, as the Mayor says, the hub of the Sacramento Valley, but we will find that around this hub there will be settlements; and it is for you people whose business it is to see that the fruit industry grows, to hold your conventions and to take up these questions and to solve them right, and I know that you will.

I am glad to be with you here to-day, and I want to assure you that as long as I am Governor of the State of California I will do all I can, through our State Commissioner and through your County

Commissioners, to promote and care for the fruit interests of our State and make appropriations to develop our farms and help carry on investigations along the line of horticulture and viticulture. (Great applause.)

SECRETARY ISAAC. The next number on the program is an address by our State Commissioner of Horticulture, Mr. Jeffrey. Mr. Jeffrey has had wide experience in horticulture in the State and has been at many of our conventions, but to-day he addresses you for the first time as State Commissioner of Horticulture. Ladies and gentlemen, I have pleasure in introducing Mr. Jeffrey. (Applause.)

PRESIDENT JEFFREY'S ADDRESS.

Ladies and Gentlemen: For the first time in almost a generation a State Commissioner of Horticulture other than the Hon. Ellwood Cooper has been chosen to administer this office and to preside at a meeting of the fruit-growers of the State in convention assembled. I appear before you to-day with some hesitation, a stranger to many of you, and yet acquainted in some measure with the work to be done in this office, and earnestly ask your forbearance of the many deficiencies that may be shown in my administration of this great trust. To the older members of the Convention this change of officials appeals with peculiar interest and some misgiving, because of the fine personal qualities of Mr. Cooper, his attainments in horticulture, his services to the State, and his long association with them as their president and friend. The younger members of the fruit-growing fraternity, who equally respect and love the retiring Commissioner, also regret the loss of their leader. This admiration of a good man is not confined to this organization, or to any section, but the people of the whole State join in tribute to his admirable qualities and in appreciation of Mr. Cooper's public services of the last thirty years. I wish to be foremost in the expression of these sentiments and to hope that this Convention may indorse, and forward to this great advocate of horticulture, a testimony of esteem that gives voice to these feelings in an official and cordial testimonial.

One need but refer to the records of thirty-two conventions to discover the wide range of their activities, and to understand that they have been fruit-growers' conventions in fact, and made the forum in which the fruit-growers could have sole voice in the consideration of their own interests, free from interference and undisturbed. Not only have subjects been given place here pertaining directly to the fruit industries and all other enterprises of farm life, but many great questions have been wrought out whose value is but little remote from the main

issues. The abuses of the private car lines have been catalogued and condemned before these meetings oftener than before all other unofficial bodies combined; freight rates upon orchard products have been analyzed and reductions demanded by the members of these conventions; better time and facilities in the transportation services of the State's perishable products have been discussed and declared imperative; the coöperative marketing of fruit has been given the right of way in many warm discussions, and advancement made in many cultural lines and publicity given to many practical and scientific discoveries of value to the fruit-grower. Some progress has been made also in bringing to a better basis the farm labor supply; the parcels post has been indorsed, good roads advocated, and encouragement given to every good movement throughout the State and with special preference to those pertaining to the moral and material advancement of the farmers and fruit-growers of California. One need but refer to these annual reports to realize the wholesome and helpful tone of these conventions, held for a generation under the direction of the gentleman who now retires with the respect and love of the people of this great commonwealth, full of the best wishes of his fellow citizens everywhere. Less than a full recognition of Mr. Cooper's character and achievements would not do justice to this remarkable occasion, which closes an association perhaps the longest of its kind in the history of horticulture. In recognition of the faithfulness and sincerity that have ever distinguished the attitude of Ellwood Cooper toward the welfare of the fruit-growers, I wish to express the hope that the new administration may be as sincere in its purpose to do good. I wish to pledge you that any changes of methods or policies made by your new Commissioner will be attempted with reasons thought to be obvious and acceptable to the people of the State. No one worthy of your confidence, and competent to hold this great office, would promise to follow the policies and plans of his predecessors; but I know that a safe example has been set for me in the work of this conscientious man, and I shall try to keep faith with its spirit to the end of my term.

But we must turn from this inspiring subject to the duties and conditions that now confront us. In the year just closing California has experienced the most prosperous season of fruit-growing since the days when the pioneers discovered that all the gold of the State was not to be mined from the soil, that the pick was not greater than the plow, and that sluicing was not more profitable than the use of water upon the fruit farm. This prosperity has extended from the northern limits of the State to the international line, and it has brought affluence to all the land. Judging from the achievements of the passing year the outlook for the future of fruit-growing is most reassuring, and justifies a very optimistic view of its security, and of the

high value of good land throughout the State. So great have been the revenues of the last fruit crop in the orange districts that the net cash received by the citrus growers would pay for the construction of the Owens River conduit, which President Roosevelt says is the most remarkable undertaking of its kind in modern times. The deciduous fresh fruit business of this year perhaps passes all records for steady, lucrative prices; prunes in this valley and elsewhere have brought riches to hundreds of growers; grapes have touched the highest mark in many localities; walnuts have sold twenty per cent above the averages of past years, and all through the lists from small fruits to melons we hear the same story of satisfactory fruit returns. It is time the voice of the croaker was heard no more in this State of plenitude, and that the counsel of the hopeful and helpful be given the ear of the orchardist.

While the fruit-growers are deeply concerned with the causes that have led to the successes of the banner year of 1907, they must also consider the adverse influences that may greatly affect this prosperity in the future. It is certain that the obstacles to profitable horticulture are increasing. Our soils are becoming more difficult to handle, insect pests lay heavier tribute upon our orchard crops, fungous and bacterial diseases are becoming more frequent and virulent, and altogether the practical and scientific exactions of our orchards, farms, and vegetable fields are becoming more strenuous every year. Should we lose courage in facing these growing adversities? On the contrary, we find in them great encouragement, for in them is the compelling call to a higher order of horticulture, advanced as is our State in this, her greatest industry. Just as the difficulties of doing legitimate and profitable business in this country have been exposed by the financial and investigational events of the last year, to be corrected for good by the genius of the American people, so are the vicissitudes of fruit-growing to be better understood and mitigated by scientific investigation and specific, practical detail in the growing and handling of California fruits. These intellectual exactions of the orchard, and the bothersome requirements of detail will help to eliminate competition by the reduction of unfit fruit, and will be followed by the greater elevation of our horticultural industries and their final emplacement above most other avocations where skill and business capacity are required for permanent success.

The United States Government is busy all over this State with helping us in our present difficulties and providing against those of the future. Powell is in Southern California for his third year, investigating with his assistants the faults of packing and shipping citrus fruits; Marlatt is there also with his helpers studying the use of cya-

nide in the fumigation of trees; Husmann is established in the Sacramento Valley working out the problems of vine stocks, varieties, and vineyard conditions; Waite is with us both in person and with a corps of assistants lending a hand toward the control of the most virulent disease known to pomology; Mackie is engaged in mapping the soils of this section; Pinchot is patrolling the mountains of the State and planting the forests anew for the protection of our water supplies, and many individuals upon the payroll of Uncle Sam are pursuing lesser avenues of investigation throughout the State. The head of one of the above departments invited me the other night to attend a chance meeting of his young associates at the Capital City. When these young men began to unfold the secrets of the vegetable world one might think, "How fortunate that the Government had turned them out into a valley broad enough and long enough to hold all this learning." Before the evening was over I was ready to vouch for every one of them as a practical man, without fads or visionary pursuits, and thoroughly equipped for the work assigned him. These are the advance guard of better horticulture, the young men whose success and standing are bringing back to the farm the boys of the country, the men the Government has sent among us to help in making fruit culture in California more stable and profitable in all future years.

But what are we of the State doing for ourselves? A great work whose familiarity to our people should not lessen their appreciation. California has two great departments charged with the promotion of horticulture and kindred interests; namely, the University at Berkeley with its various auxiliary stations, and the State Horticultural Commission with its many correlative county organizations. The former is delegated with the investigation of scientific problems touching the interests of field and orchard farming; the latter with the practical care and protection of the horticultural industries of the State. With the exception of a very few unimportant but exasperating cases in these two departments, they are in harmony and coöperation, and must be brought into closer relationship to meet the demands of the people who pay for their support. Unfortunately, the enactments under which these coördinate institutions operate do not clearly define the scope and duties of this dual responsibility, and it is therefore not strange that pedantic criticism on the one hand and ignorant egotism on the other have bubbled up occasionally, to the amusement or disgust of the State. I am sure that both of these institutions will stand for the removal of these frothy utterances in the future, for the betterment of the great work before them. And the people will say, "Amen."

The University of California is forwarding the agricultural interests of the commonwealth in a manner excelled by similar institutions in but few states, and not surpassed by any state if we take into consid-

eration the diversity of conditions and the magnitude of the difficulties of cultivation in the insimilitude of our soils and situations. And yet no field is so white for the harvest of investigation, no territory so urgent with the demands for scientific examination and practical conclusion. To fulfill its field and educational mission the University must have masterful guidance, faithful service, and constant coöperation. The latter is hereby pledged, as far as the State Horticultural Commission is concerned, for I have subscribed for years to its every act and policy. To give spice to my sincere indorsement of this great institution, I wish to note one exception. I do not approve of the late attempt to exterminate the white fly with printer's ink, for the process is as tedious and tasteless as ineffective. Otherwise I continue to favor the policies and applaud the successes of the University in the large work it is doing for the farmers of California.

No less important is the work of the office which I hope to represent with some approval for the next four years. The office of State Commissioner of Horticulture is largely executive and is charged with duties and endowed with powers neither possessed nor needed by any other department. It is a clearing house of horticultural information, not a bureau of scientific investigation other than is necessary in making effective its quarantine department, and its control of insect pests and plant diseases; it is the horticultural patrolman of the State, its badge of authority the quarantine code; it is not the detective of soil salts, the discoverer of varietal adaptations, the sleuth of pathologic troubles in plant life, or the officer to bring to book the thousand secrets of nature that perplex or impoverish the farmer. The office of State Commissioner of Horticulture is not the State schoolmaster of horticulture charged with the duty of bringing back to the soil the escaping young men, or of educating the rural people in the technical departments of horticulture. These matters properly belong to the University. Rather is the Commissioner's office the statistician, the secretary of correspondence with horticultural societies, colleges, and schools upon applied knowledge, and, above all, the medium through which protection is afforded to the orchards of the State, and pursuant of which this great office is empowered to bring into businesslike coöperation the County Horticultural Commissions in the enforcement of the laws designed for the exclusion of insect pests and disease, their extermination or control, and in meeting any emergency that may threaten the fruit-growing enterprises of the State. To secure this coöperation the law has made your State Commissioner member *ex officio* of every County Board of Horticulture, and I shall try to fulfill this duty to the best of my ability.

Upon the policy of protecting from insect pests there is an idea extant that the new administration will be at variance with the old, especially

in the search for and use of beneficial insects. Statements have been made that, if true, should disqualify me from holding my present position, and as far as I know the belief in these statements is the only bar to my acceptability as your Commissioner. I would not refer to this personal matter if it did not touch so closely the work of this office. And then you have the right to know my attitude upon a question so paramount to the success of fruit-growing. A circular was sent all over the State last summer in which, with other remarkable matter, the statement was made that my candidacy was a direct challenge to Mr. Cooper's policy of using parasitic insects in the control of orchard pests. The charge needed no denial in the south, and it is useless to deny anything in the warmth of a contest of this kind. I think it is proper now, however, to suggest that the authors of this circular depended entirely upon their imagination for their facts, for my faith in the efficacy of parasitic and predaceous insects is now, and always has been, as firmly grounded as that of any other individual's in the State. The gentlemen who have erred in this matter are known for their honorable membership of this Convention, and for their loyalty to the fruit interests of the coast, and I know it will be a pleasure for them to discover their mistake, and to continue to support the office with which their work has been so long and faithfully identified. I believe, however, that some of us have lost the sense of proportions between the so-called natural and the artificial methods of fighting insect pests, and I hold that these proportions may be equalized in the public mind without abating in any degree the search for new insect friends or relaxing in the nurture and distribution of our native beneficial species. I know by experience how easy it is to exaggerate the achievements of parasitic insects. Four years ago, when the *Scutellista* seemed to have the black scale at its mercy in the south, the Los Angeles office led the procession in boasting of the triumphs of the little fly; and I was in the front rank of the boasters. Many of our people joined in the noise we made over the work of the fly, some doubted, and one friend felt it his duty to remonstrate with us for making such extravagant claims. He said our office reminded him of Lincoln's Mississippi steamboat. Lincoln said he went up-river one time on a boat which had a whistle so much bigger than its boiler that they had to stop and tie up to a stump every time the pilot wanted to blow for the next landing. I hope to carry this lesson through the four years of my administration. Within the next three months we hope to have the Insectary built. Time will prove this institution one of great value. Its successful operation will be in line with my predecessor's much cherished policy, and I propose, when the Insectary is finished, to have placed in its entablature this inscription, "Founded by Ellwood

Cooper," and then a line indicating the years of his services to the fruit-growers of the Golden State.

If the optimism of the present time is to be permanent and become brighter in the future, the fruit-growers of the State must take advantage of their opportunities to the fullest extent. Of what avail is the work of the United States Government, of the University and of the State Commission if the growers do not respond? What is to be gained by investigation and demonstration if the growers continue to plant unsuitable kinds and varieties, or do not match their crops to their soils, or buy cheap and impotent stock for their orchards? What advantage to know all about soil chemistry and forget selection and pedigree at planting time? Can your Horticultural Commission assist in lessening the troubles that beset the business of fruit-growing? In some degree, yes. It can be made the means of your broader and more forcible expression. You can enact laws that will tend to eliminate or to make responsible unfit nurserymen, and see that your officers enforce them. Require your Commissioner to take notice officially of quacks, and frauds, and misrepresentations, and dishonest dealings in all that may degrade your fruits and discourage superior productions. You can see that his office be made the source of publicity for all the good things and the bad that affect fruit-growing. The Commissioner's office is the only rallying point where all horticultural interests can unite for common good in the practical solution of their protective and working policies. But this can only be made possible by widening the field, and making room for their effective consideration in this office which was created for the safeguarding and promotion of commercial fruit-growing.

It is a shame that this great office under whose auspices you are assembled to-day has to plead for a bare existence when it should be equipped to give back to the State ten thousand times its cost every year. It would not drink from the finger bowl, nor swallow the knife, nor eat the bouquet, if given a seat with the more scientific institutions that are so richly sustained with means of doing the work they have so well in hand. The scope of the office which I represent is broad enough. It should have officers with executive ability and should be backed with the funds to make its work felt throughout the length and breadth of the State. To this end the laws concerning the appointment and support of our County Boards of Horticulture should be wiped off the statute books and reenacted in a new and effective spirit; the county quarantine ordinances should be destroyed and a uniform one adopted that would be more stringent and effective, without driving our nurserymen to distraction, as they are driven under the present lack of system. I believe this feasible, if every fruit-growing

county were compelled to maintain an efficient Horticultural Commission, appointed solely on merit and supported by an able corps of inspectors. These appointments should be divorced from politics and governed entirely by fitness for the work required. I shall carry this idea into the administration of the State Commissioner's office, for merit will govern every appointment, and no one in the State will expect any other policy to prevail. Time will not permit further reference to the work that this office should do, nor to many other topics that demand attention.

At the risk of your impatience I must pay tribute to the chief of the forces that stand for betterment of fruit-growing in California—the men and women of the country homes, the artisans who have built the grandest horticultural structure in the world, and have established here the highest degree of rural civilization upon the face of the earth. Twenty-seven numbers on this Convention's program are represented by these people. And who shall say their achievements are not far beyond those of all other forces combined? These are the architects of the State's real grandeur. These are the people to whom the elimination of an unfit fruit is greater than the creation of a hundred varieties, the delineation of suitable soils for the cultivation of their crops of more value to them than an encyclopedia of horticulture, the possession of an honest nurseryman of more worth than another farm. They are here to speak for themselves. They pay for all, and all should listen. All honor to the fruit-growers of the State. May their prosperity never grow less nor their influence in these conventions be abated.

THE CHAIRMAN. Ladies and Gentlemen: The next on the program is an article from Edward Berwick, one of our oldest and most honored members. Mr. Berwick will now read a paper on "The Fruit-Grower and the Parcels Post."

THE FRUIT-GROWER AND THE PARCELS POST.

By EDWARD BERWICK, OF PACIFIC GROVE.

With prunes and raisins at five cents per pound and canning peaches at from forty dollars to ninety dollars a ton, it may be hard to persuade the fruit-grower that he wants anything more this side of Paradise. Of course, we must except the extermination of the white fly and the control of the pear blight. He may feel a little exercised as to the labor question; but, as sales f. o. b. are easy, he can afford to let the other fellow worry over the old vexatious transportation troubles. In Los Angeles four years ago the fruit-growers were telling quite a different story. We were then as unanimous as Jonah in the belly of the

whale that our transportation troubles would be lessened, and our cash in hand materially increased, if Congress would authorize the Postmaster-General to institute an up-to-date parcels post, such as is enjoyed by other civilized countries.

To agitate for this end, the Postal Progress League of California was organized. No doubt many of you have since then read or heard various arguments, favorable or unfavorable, concerning the matter. But lest many of you are not familiar with the parcels-post idea, let me briefly inform you of a few of the facts.

Almost all the civilized world regards it as the function of the postoffice to carry not only letters but also packages, varying in weight from ounces to hundredweights. Switzerland, for instance, permits the mailing of anything that will pass through the door of a railroad car. Rates are various, but extremely low. Thus Germany, for 6 cents, within a 46-mile radius, sends 11 pounds, and for 12 cents all through, not only her own domain, but also through Austria-Hungary—a possible 1,500 miles. Great Britain sends 3 pounds to farthest India for 24 cents, or 11 pounds for 72 cents. While we, as you know, pay 64 cents for 4 pounds from Marysville to Chico. By a curious and ridiculous anomaly this same 4-pound parcel can be sent all the way to London, England, for 48 cents—12 cents less than it costs to Chico; so a suit of clothes can be mailed to Marysville from Dublin, in Ireland, for less than from San Francisco.

At the same time, for the *British* public, the American express companies carry all parcels up to 11 pounds from New York to any point in the United States for 24 cents; when an *American* citizen, living in his own country, wants to send an 11-pound parcel from Pacific Grove to New York, the same express companies charge him \$2.35 for the same parcel. You need not suppose that the 24-cent rate is given to the Britisher "because they love him so"; simply there are dollars in the job for the express companies, even at 24 cents. It helps to swell the \$30,000,000 surpluses of the Wells-Fargo Express Co. and to make possible the 200 per cent stock dividends of the Adams Express Co.

What these express companies do for the foreigner your postoffice could do for you. But do you want it done? Do you believe that cheap transportation increases trade? I don't know how Marysville feels to-day; but I do know that over three years ago I made a call on Mr. A. A. Watkins, President of the San Francisco Board of Trade. I wanted to enlist him and his board in an enlarged commerce, made possible by cheaper transportation of packages by mail. He said to me, "No, sir. We had a man at Washington last session of Congress purposely to oppose the passage of any parcels-post bill, and we'll do so again! Why, in Marysville the retail hardware dealers of northern

California just held a convention, and called upon us to take this action, and we'll do it."

Well, it seems to me irresistibly comical that retail dealers should oppose a cheaper method of getting goods delivered at their doors. From that time on inspired editorials have appeared continually in the press, telling the storekeeper that with a parcels post in vogue he would be ruined. Who inspired such editorials it would be easy to guess. The stuff was even published in San Francisco as telegraphed from New York. And under the guise of opposing the Eastern mail-order houses, it gave them a splendid free advertisement. It was alleged that a parcels post would throw all business into the hands of the mail-order houses, who could, would, and did easily undersell the local trader. On this account merchants, as individuals and in their various associations, were vehemently urged to oppose its institution tooth and nail. Certain jobbers in San Francisco even formed an Anti-Parcels Post League. Their organ was the *Pacific Coast Merchant*. They feared that the retailer would avail himself of the parcels post to buy his goods direct from the various factories, and so benefit himself and his customers. One such jobber with whom I conversed, after trying the mail-order house talk, frankly admitted that the parcels post would prove a permanent benefit to the local merchant; but, he claimed, would injure the jobber.

As to why the local dealer should be hurt by a parcels post no one has yet found out. That the persistent calamity-howling of the express companies is already becoming ridiculous and ineffective, the recent indorsement of parcels post by the Society of Retail Merchants of New England loudly attests.

On the face of it, the contention as to injury being worked to the local dealer bore its own refutation.

The parcels rate asked of the postoffice was 25 cents for 11 pounds. Now, it is safe to say, that five sixths of the population of the United States live within such distance of some large mail-order house as to get their goods delivered by freight at a rate much less than this 2 cents per pound. It is also well known that department stores, even in California, already deliver goods from their bargain counters free of all charge for transportation. In spite of this, I am sure you will all acknowledge that in Stockton, Oakland, Berkeley, Sacramento, and even in Marysville, there were never better stores with finer stocks of goods than there are to-day. This absolutely free delivery has had no such ruinous effects as have been predicted. Moreover, were the mail-order business so exceedingly profitable, it would be easily within the bounds of imagination to conceive of branches of these large mail-order houses established at San Francisco, Los Angeles, or Sacramento

sending their goods by freight at much lower rates than the advocates of a parcels post have suggested.

And, by the by, has it ever occurred to the Marysville merchants that they were giving these same mail-order houses the biggest kind of a boost by getting the press all over the country to proclaim that goods could be bought cheaper of those houses than of the local dealer? Is not this a free advertisement for those houses of the utmost value? Is it not a direct invitation to any wide-awake buyer to purchase of these houses?

I am glad to be here to-day, not only to tell them that if this is really their argument it is "bad business," but also that their whole opposition to the parcels post is, as they are now slowly discovering, also bad business.

In the first place, the parcels post has proved in other countries a most powerful stimulus to trade. The retail merchants would in those countries be the first to object to its impairment or abolition.

In the second place, the lack of a parcels post has been, and is likely to be, the cause of more orders going to mail-order houses than otherwise would be the case. Postal rates and express rates on purchases being largely prohibitive, buyers naturally turn to freight rates. To secure these, a minimum freight of 100 pounds must be paid for. So if Jones wants only 25 pounds of goods, he suggests to neighbors Smith, Brown, and Robinson that they should pool issues and each send for 25 pounds, dividing the freight charge among them. Jones lends them his mail-order catalogue and each selects the goods he needs, and the local dealer thus loses the sale of 100 pounds of goods instead of 25 pounds. Or, Jones himself further scans the catalogue and sends for 75 pounds more goods than he would otherwise have ordered had it been possible to send for his 25 pounds by parcels post. This is no far-fetched, fanciful instance; it is what is now being done, and the best way to check it is to institute an up-to-date parcels post. This is the true method of giving the small local merchant a chance to compete with the big houses. It widens his stock and practically multiplies his capital. As to local buyers, there is no doubt they prefer buying things of local dealers where those dealers understand their business. The average buyer hates to write a letter, or even to fill in an order blank. He wants to see the articles he is to pay for before he parts with his coin. He wants his goods *now*, and not five or six weeks hence. I am glad, therefore, to learn that those retail merchants who oppose parcels post have reconsidered the matter, and decline any longer to be dupes of the express companies.

Concerning the stale fabrication as to the demand for a parcels post being raised by the Eastern mail-order houses, as President of the California Postal Progress League I can vouch for the fact that not a dollar has reached our treasurer from any one of those houses; and not even a

single word of encouragement. Of course, if there are individual retailers who choose to cherish the notion that paying exorbitant rates to swell the extravagant dividends of express companies really benefits them and their customers, that is their privilege as citizens of this free republic. If the experience of the past does not convince them that all improvement of transportation facilities increases commerce, I can not hope that any argument of mine will avail. If there be such an one still in California, at least let him cease from advertising the Eastern mail-order houses by getting his local editor to tell the farmers that they can buy cheaper in Chicago than they can of him. He had better spend his time hustling to buy his own goods cheaper by buying direct from the factory and getting things delivered by cheap parcels post, where there will be no rebates and no special rates of any kind. The world moves, and the retail merchant must keep step or lose his place in the procession. He must accept the means at hand to hold his own, and in this struggle with the Eastern mail-order houses the parcels post is the very weapon he wants to aid him in his warfare. By its aid he can stand, if he will only cease telling all the world that they can buy cheaper in Chicago than they can of him. The fact of this having been the one stock argument put forward to discredit the parcels post, certainly demonstrates that the express companies and not the merchants are the real opponents. It is surely incredible that any body of intelligent California merchants would be so insane as to spread a report up and down the length and breadth of the land that consumers can profitably send to Chicago for their goods instead of buying at home. I trust our merchants have such abundant good sense as shall lead them to denounce their being any longer made cat's paws to rake out hot chestnuts for the express companies' ravenous maws.

My time runs short. But permit me one word to tell you how British farmers and fruit-growers are subserved by the parcels post. By the adoption of packages of size and weight in accord with postal regulations the British farmer can have his produce taken from his gate by postal motor or wagon, shipped in the cars, and thence delivered at the house of the addressee in such quantities as suit his convenience. Similarly, goods can be shipped to him from any part of the kingdom and delivered at his gate. It does not matter one whit whether it is cream, butter, eggs, fruit, fish, or fowls—anything goes, goes on time, and gets there on time. One firm shipped 70,000 parcels in two days.

Just how useful such an institution would be to us, each one can readily picture for himself. The endless waste of time, and the constant annoyance daily experienced for lack of such service, we all too keenly realize. The comfort of such an institution, the saving of cash and energy, of time and temper, also appeal to us all. Whether we are to enjoy this inestimable boon to all classes depends upon ourselves. We

are too prone to relegate our responsibilities on that impersonal thing we call our Government. We forget that *we* are the government, and that unless we, the people, issue *our* mandate no reforms are possible. All reforms come from outside pressure, not from spontaneous internal action. It is for you to instruct your Congressman in such forcible and unmistakable terms as shall leave him no option but to vote for an up-to-date parcels post or make way for one who will.

A MEMBER. Has the postal service in England, Germany, Switzerland, and France wiped out the local dealer?

MR. BERWICK. I caused inquiry to be made regarding that. I received word that, if there were any talk of impairing the parcels post, the retail dealer would be the first to object. It subserves his convenience very fully. I also did more than that. I wrote to London to inquire what the effect of parcels post had been on the express companies. They have no express companies under that name in Great Britain, but they do have what they call parcels delivery companies. I have a letter, I believe, from the manager of the London and Westminster Bank, one of the largest banks in London, saying that there were no shares of that company on the market; they were all held by families who were extremely wealthy; so even the express companies can live and compete with parcels post at those low rates. They can not pile up, I presume, in a few years, \$30,000,000 surplus or declare great dividends. (Applause.)

In the absence of Prof. W. T. Clarke, Secretary Isaac read his paper entitled "Extension Work of the College of Agriculture of the University of California."

EXTENSION WORK OF THE COLLEGE OF AGRICULTURE OF THE UNIVERSITY OF CALIFORNIA.

By PROF. WARREN T. CLARKE, OF BERKELEY.

The history of the Colleges of Agriculture and Experiment Stations in the United States can be readily traced through four lines of general activity. In the first place, the endeavor has been to build up a science of agriculture. This endeavor demanded the gathering together of a vast mass of facts through the mediumship of experimental work, and we find that this has been and is being done by the institutions in question. How well the work has been prosecuted, and how great may be the value of the results obtained, it is not our purpose to discuss at this time. It will suffice to say that each succeeding year finds these institutions receiving renewed support and their methods of work being adopted and becoming the common farm practice.

Of course, the facts that might be established through this experi-

mental endeavor would be useless and inert did they not become the common property of others besides the college and station workers; hence, we find the function of *teaching* taken up by the members of the station staff of experimenters as a very necessary part of their activities.

By the college courses in agriculture the results of the experimental work became a part of the working equipment of the students in these courses, and through them to a certain extent the property of the interested farmers. The number of those benefiting in this way was of necessity limited, and to reach a larger audience publication of methods of work and results obtained, in bulletins, is and has been, since the beginning, the third form of activity of the Experiment Stations. These bulletins give in concise form the necessary data upon which procedure should be based to obtain certain results, and undoubtedly have been and are of great value to the agricultural and horticultural interests of the country.

Satisfactory as far as they go, the lines of activity heretofore described were found in experience to be not broad enough to adequately cover the ground, and a fourth line of endeavor has been the result. This is included under the broad title of University Extension in Agriculture. Various activities are carried on under this heading, all tending toward making available to the farmer information necessary to him in the successful prosecution of his work. Under this heading, probably Farmers' Institutes have in the past received more attention than any other one item. The Farmers' Institute is, in its make-up, a meeting of those engaged in agricultural pursuits addressed by men who, in Experiment Station and College of Agriculture work, have studied over and experimented on the very problems confronting those who make up their audiences. By this means, the experience and thought of the worker along scientific lines are carried directly to the man who should profit thereby. Not alone, however, does the man from the college make himself heard in these meetings, but the practical worker, the farmer, the horticulturist, who is in the business and has made a success of it, is led to tell of his work and methods. Thus, all sides of the particular question receive attention and the farmer receives the benefit. That no point may be missed, no item of value fail to get due attention, is the prime object sought, and therefore we find in the Farmers' Institute the asking of questions encouraged and indeed insisted upon. In fact, it is recognized that only in the asking of questions and in the free discussion of pertinent matter can the full value of these meetings be realized. As one of the forms of work in University Extension in Agriculture, the Farmers' Institute undoubtedly fills a very important field; yet it has been recognized that the business of farming demanded,

in some of its phases, more detailed and intensive instruction than could be expected from the Institute.

We find, therefore, reading courses for farmers offered as a further amplification of the Extension work, and the Department of University Extension in Agriculture of the University of California has the rather unique distinction of being in the lead of such departments connected with the Experiment Stations and Colleges of Agriculture, in the matter of these reading courses for home study. At the present time the department in question offers two such courses, one in economic entomology and one in irrigation practice and institutions. Any one desiring to read up on these subjects, in a systematic way, may enroll in the courses, and literature will be furnished him, free of all cost save the expense of transportation of the books from and to Berkeley. These books and publications are chosen as being representative of the best thought and study and experience on the questions at issue, while the students using them have the privilege of referring questions that may arise to those members of the staff of the College of Agriculture, Berkeley, who are specialists in the subject being studied. The courses may be considered as bringing University Extension teaching to the students' homes.

Other forms of work are undertaken by the department in question, but enough has been said to indicate the policy under which it works. How well the purpose and spirit of the institute movement are being carried out can be perhaps best shown by a review of the work done in the past year. This review must to some extent deal with figures, but is instructive none the less.

During the past year Farmers' Institutes were held in 30 counties of the State. The total number of institutes held during the year was 84. Of these, 33 were one-day meetings; 48 continued through two days; while 3 were of three days' duration. The total number of sessions was 296, while the total attendance at these meetings was 20,470; making an average attendance of 69 at each session.

It required the services of 23 State lecturers and 195 local speakers to carry on the work of these institutes. Of these State lecturers, 13 were employed at various times to give instruction in special topics, while 10 lecturers and demonstrators from the faculty of the College of Agriculture devoted a total of one hundred days to the work.

In addition to those already noted, three general institutes were held. Two of these were in conjunction with the State Teachers' Institutes at Fresno and Chico, and one with the Sonoma County Grange. The total number of sessions at these meetings was 8, and the total attendance 2,500, or an average attendance per session of 312.

The work done at these institutes covered, from both the practical and the theoretical side, many of the problems confronting the agri-

culturists and horticulturists of the State, and can be considered, judging by the interest indicated through the figures just given, to be of actual value to the farmers of California.

We believe that this educational movement along the lines of a better and more scientific agriculture is of great significance, and points in the end to a better and more stable, more dependable citizenship for our State.

There remaining a few minutes before time for recess, Mr. Berwick called the attention of the Convention to the so-called "Tin-Can Club," the object of which is to interest the children of the public schools in the planting of trees in tin cans, and then finding some man with a large tract of land that is not being utilized and getting him to plant trees on his land. Mr. H. A. Green, of Monterey, will send to any one interested a booklet entitled "Practical Forestry Simplified."

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION—FIRST DAY.

TUESDAY, December 3, 1907.

The meeting was called to order by the Chairman.

MR. JUDD. I move that a committee of three be appointed on the Chairman's address, the committee to be named by the Secretary, and that the President also appoint a committee of three on the Governor's address.

The motion was duly seconded and carried.

The Secretary appointed as the committee on the Chairman's address Messrs. A. N. Judd, S. A. Pease, and E. Booth.

The President appointed as the committee on the Governor's address, Messrs. Edward Berwick, F. W. Crandall, and R. P. Cundiff.

MR. BERWICK moved that the Chair appoint a committee of three on resolutions. The motion was duly seconded and carried, and the Chair appointed as such committee, Messrs. John Markley, James Mills, and H. P. Stabler.

THE CHAIRMAN. Ladies and Gentlemen, we have Mr. Lownsdale, representing the Willamette Valley, who will give us a paper on "Apple Growing in the Willamette Valley."

MR. LOWNSDALE. Mr. President, Ladies and Gentlemen: For many years I have stored up for myself the pleasure of attending some of

your annual meetings. I have for all those years read the reports of your annual meetings so faithfully that I have become well acquainted with all the growers of California, exceedingly well acquainted with them by name, and I am glad indeed to be able to be here to-day, where I may possibly take some of these growers by the hand and look into their faces, here in this city of Marysville. Just think of it! In Marysville and Yuba City, names hallowed in the romance of days! When I was reading these reports of your annual meetings, I had never hoped to be asked to address any of your meetings. I thought, "If I could only be there at some time," but it never occurred to me to be asked to address you, because that was beyond me, an Oregonian in the backwoods; but I am happy to have been asked and happy to be standing before you to-day, even if I compel you to listen to a very elementary essay on horticulture. You know, in Oregon, at our State meeting, each one comes along with a little primer of horticulture and recites his A B C of horticulture, and recites it with great seriousness and sometimes with sobriety, and I will have to do the same—that is, as to the seriousness. We have not got out of the rut. We know our A B C's, but the E F G's are beyond us; so it will be a very elementary paper on the every-day happenings in an Oregon apple orchard to which you will have to listen. I would like to say further, that I do not wish to be understood as attempting to speak with any semblance of authority, any semblance of scientific authority, upon any subject, any abstruse question of horticulture, for I am only a layman, and I wish to leave all those deeper problems to deeper thinkers.

APPLE-GROWING IN THE WILLAMETTE VALLEY.

BY M. O. LOWNSDALE, OF LAFAYETTE, OREGON.

The growing of apples in the Willamette Valley was one of the first industries undertaken by the Oregon pioneers. To these adventurous souls, these crusaders to a holy land, the great valley with its fertile soils, abundant moisture, and delightful temperature seemed the natural home of fruits that were the joys of their childhood days. The planting of apples resulted—at first in a tentative way by the trial of seedlings. The remarkable productiveness of these seedlings was everywhere noted and soon led to the introduction of grafted trees. In the fall of 1847 the first grafted apple trees were planted in the Willamette Valley and were the first grafted trees to be planted on the Pacific Coast. You know we had several years' advantage of you in the matter of immigration from Eastward and our tree plantings antedated yours somewhat. These trees thrived. The beauty, the lusciousness, the perfection of form, color and size of their fruit gave to Oregon a wondrous

fame, making its name a household word throughout the Western and Middle States as "the land of big red apples." We, the sons of those sturdy pioneers, glory in that title to-day. Other sections may appropriate, other sections may imitate, but the Willamette Valley will always be the true, the original "land of big red apples."

In these early days fabulous sums were obtained for the output of our orchards. Twenty, thirty, forty, sixty dollars per box were not uncommon. The product of a single tree was sold for \$260, and a single box containing 75 apples was sold by Mr. Lewelling of our valley for \$75.

San Francisco and the gold mines of California were our principal customers. But the marvelous development of the fruit industry in California, and the lack of transportation to more distant centers, robbed the valley of its markets. The varied interests of farmers in the fertile valley, where so many lines of industry thrived, caused the orchards of those early days to be neglected, forgotten, and they soon passed into a ghostly semblance of their primal glory. The majority of them remain now, time-worn and rusty, hoary with moss and bending to their mother earth as if to lay them down in a long rest. Yet these old friends, in whose arms many of us have lain in our childhood days, these old friends burdened with the infirmities of age and the ills which their guardians have allowed to creep in, are each year trying to do their best, pitifully trying to show us fruits of the quality of those early days, faithfully trying to give returns for the little attention they have received during a lifetime.

But we of a younger generation, believing somewhat in a reincarnation of souls, propose to give a new life and vigor to these old orchards, by cutting them back to the ground, allowing them to grow a year and top-grafting into Yellow Newtowns. Then by stringent legislation, to compel owners to keep these rejuvenated trees free from pests. With the encouragement, the care they will receive hereafter, these old hard-working friends will again carry the fame of the Willamette Valley to the farther coast, and beyond. This matter is already well in hand and some trees planted in '52 are to-day bearing fine crops of newly grafted fruit. There is practically an unlimited market in England for Yellow Newtowns to which we propose to cater. This variety is a very slow grower in our valley and needs just the virile root-system of these old orchards to give it thrift and vigor.

However, it is not upon these pioneer orchards that the Willamette Valley depends for the maintenance of her fame as the "land of the big red apple." Large commercial orchards have been planted in various sections of the valley and are annually producing great quantities of fruit that, in each succeeding year, bring higher and higher prices in Eastern markets. The work of growing apples for these sensitive and hypercritical markets has become a specialty with many Oregon orchard-

ists. The extreme care necessary to produce Spitzenbergs, for instance, running 72 and larger to the Oregon box, all of high color and without blemish, fruit that brings from \$2 to \$5 per box, makes orcharding an operation of delicate exactness and of constant watchfulness. The cheaper grades of apples, like Baldwins, Ben Davis, Rome Beauties, etc., do not require such close attention and do not need to command such extreme prices to be profitable. Yet the best orchardist is he who tries to approach as nearly as possible the standard in everything he grows, and so there is great rivalry in the specialty work of apple-growing in Oregon.

We of the Willamette Valley claim to produce the highest type of Spitzenbergs grown on the Coast (which means in the world). The true Esopus Spitzenberg is an elongated apple, brilliant in color, musky in flavor, and rich in the spicy oils and juices that taught our youthful palates an ecstasy to be remembered until we pass to our graves. Such is the Spitzenberg of the Willamette Valley.

But this exquisite fruit is as shy as many a dainty maid, and must be sought by a persistent wooer if he would win her in all her voluptuousness. The kiss of a lover upon the lips of a bloom often leaves an unsightly blotch of scab upon her cheek. Her perfumes are so seductive, her color so brilliant, that codling-moths, ever haunting where beauty lies, hover in hordes about her to fondle—but ah, with stings of death. Loyally must we serve if we would protect her from the devoirs of these lovers who bring disease in their train and scars in their every touch.

To bring the radiant Spitzenberg to her greatest perfection, a moist atmosphere is desirable, an abundance of moisture in the soil imperative, and a valiant sweep of a temperate sun to soften the asperity of autumnal frosts necessary. Dry climates or soils that lose their moisture rapidly are not to be trusted with the bringing up of a Spitzenberg family. Trees of this variety are hard drinkers, and also lose more moisture by transpiration than almost any of the standard varieties of apples. They require double the cultivation that would suffice for Baldwins, and varieties should be so interplanted as to allow of this extra cultivation of the thirstier trees.

I would think there are many situations in California along the coast or water levels, along the bays and rivers, or on foothills, where there is plenty of moisture in the air, that could produce these fancy grades of apples, if close attention be given to the constitutional demands of these varieties. But the hot, dry valleys of the interior would never do for Spitzenbergs, and probably other varieties could never succeed quite so well in those sections as in our moister climate.

The worst enemy of the apple-grower in the Willamette Valley is apple-scab, as the very condition that produces the high flavor and

lusciousness of our fruits—an abundance of moisture in the air—furnishes the best medium for development of the scab fungus. As yet we have not thoroughly mastered this obstinate fellow, though we have a strangle hold upon him and keep him in fair subjection.

In handling these fungoid diseases we find that local conditions, atmospheric or otherwise, are often unique, often peculiar to themselves, and are always so variant in different localities that it is impossible to formulate a universal rule for the treatment of such troubles. We have to learn the best methods, the best materials, the best times for application by the old, hard knocks of experience. We must abandon many of the scientific formulas, and, following the doctrine of selection, adapt them to our local needs. For instance, winter treatment of the scab fungus seems to be of no value in our valley and we are compelled to dodge the rainstorms of late spring and, in a moment as it were, dose our trees with preparations of Bordeaux or similar fungicides. As soon as the blossoms drop, we are out combining with Bordeaux one of the arsenicals for the many beetles and measuring worms that inevitably make their homes in an apple orchard. No effort is made to fill the calyx with poison for codling-moth, as in other apple-growing districts. Moths do not appear in the Willamette Valley before June 25th, and it is useless to attempt to hold the poison in the calyx cup until that time. The poison is so taken up or lost in the process of fruit elaboration, or is dissipated by dews, fogs, and rains, that it disappears in about three weeks after an application, which would be considerably before the appearance of the moth in our valley.

The labor of thinning begins as soon as the little apple-children begin to show the blessed precocity of youth. In the best practice we thin to about eight inches, and, for better protection against moths and blemishes of fungi, we cut away all foliage that touches the fruit or obstructs the rays of the coloring sun. It is this infinite solicitude, this tender care for the nursling, that gives the immediate vigor, the energy to push fruit along to the special high grade our finicky market demands. Size, form, type, the ability to color well under the proper impulses, are all given when the little fruits are in swaddling clothes as it were. Neglect at this time will cause a slow development, an inability to throw off fungoid diseases, and will leave many footholds for the attacks of apple worms and beetles. Weak pollinators, so-called self-sterile trees, like Spitzenbergs and Gravensteins, will often carry unfertilized fruit to a fair maturity, if given such an extra impulse just as the pome begins to increase in size.

This problem of pollination and the inter-related corollaries of sterility and cross-pollination have received much attention of late, and their theoretic solutions, at least, have been before us for many years. But the more we investigate, the more we study its various phases, the

more clearly do we recognize the intricacies of the problem and feel that its solution is farther and farther removed. There are at work so many influences with which we do not seem to get in touch, influences at work in the season previous to blooming, influences perhaps of soil, of atmosphere, of moisture, of temperature, of cultivation, and, perhaps, hidden influences that affect the potency of pollen—all these imperfectly understood agents, that may possibly be controlling factors, confuse us in our attempts to work out practical methods of directing the fruitfulness of our trees. In despair we can only sit down and formulate theories.

We of the Willamette Valley, abandoning somewhat the highways constructed by scientists, seem to get good results with impotent pollen-producers like Spitzenbergs by applying a combined fertilizer of nitrate of soda and muriate of potash in the spring just before bloom buds are formed. [Since this paper was read a distinguished authority has suggested that a superphosphate might give even better results than the first mentioned fertilizer.—Ed.] This treatment seems to give trees a vigor that will carry buds through the hot summer months without a loss of fertility, and at blooming time the next spring we have flowers whose pollen seems not greatly lacking in potency. This evidence is not at all conclusive and we are not prepared to announce positive results, but we believe that we can at least affect the potency of pollen to a great degree by this method. It is not so much that these varieties of shy setting fruits are always shy in the bearing of pollen as that their pollen seems impotent, and it is the problem of the grower to correct that tendency if possible. With the bare theory of self-sterility of these trees (a theory founded on experiments conducted under false and unnatural conditions) we have little patience.

True, as before remarked, this theoretic solution of this problem is ever before us. Practical men among close observers see that there are more important factors working through as yet unknown channels to be reckoned with. These observers find that the factors that control the receptivity of pistils, the potency of pollen, the virtue of the secretions that bear such important relations to the setting of fruit, are as elusive as gossamer on the summer-wind. There are no wizards of Santa Rosa among the plain apple-growers of to-day. For this special knowledge we are groping through an undiscovered realm. As in our dreams, are shadowy forms before us, a moment shown and then withdrawn. But as we catch these trembling glimpses of a truth beyond our ken, we feel that perhaps we may be groping in the right direction and hope the solution may not long be delayed.

For how disappointing, as practical assistants, are trees set for purposes of cross-pollination in orchards. Your pollinators will not bloom in the years your sterile trees need them, or some untoward or unfore-

seen condition will hasten or retard their normal blooming period and your sterile trees will bloom alone. Perhaps in one year in five you may notice the influence of pollinators in the form and vigor of fruit. But these specimens are generally more important as curiosities than otherwise. So that any method that promises to reveal the controlling factors in the setting of fruit will be welcomed by planters of self-sterile or weak pollen-producing trees, and will mark a very distinct advance in fruit culture.

The paraphernalia of a large apple orchard, and the elaborate processes of handling fruit, are as spectacular in their operation as in any of the great orange groves and packing-houses of the south. Of late years trees have been groomed as faithfully as are thoroughbred horses in great racing establishments. It is by this attention to detail that fruit is brought to that perfection which enables us to get the highest prices paid in the world to-day for apples. As you have all learned years ago, the haphazard leads to the brush heap, and every detail of our specialty work is the result of much study and experience. Study with pruning knife and microscope, study of the physical characteristics of a tree with the same minute attention which the physician or surgeon gives to the human system, study of the needs of this market and that, of new and attractive methods of packing, study of even more abstruse subjects than these—all of which require expert attention and demand that the large orchardist shall seldom "go fishing." Exactness in the matter of spraying, heedful both of time and of thoroughness, as, for instance, spraying from both elevated platform and the ground at the same time, exactness in the matter of cultivation, of thinning and watching the summer development of the fruit, exactness in allowing no foliage to touch a fruit or two apples to touch each other, such care in picking as is known in no other apple-growing section, the thorough washing and careful sizing, with specially constructed machinery, of fruit before it is stored in warehouses, the storing on ventilated trays, the control of drafts among stored fruit—these are some of the requisites that go to make the growing of high-grade apples a specialty proposition to-day, and are methods in use by the best growers in the Willamette Valley.

Apple-growers generally believe this to be the most remarkable year for their business known in a generation. So many abnormal physical conditions are found, so many of the old rots and a few new ones, rots like the brown speck in the flesh of the apple, the core rot, the new, dry, spongy rot that shrivels a thin layer of flesh under the skin surrounding the calyx, and many others of the same general family, all these are rampant this year where the layman would naturally expect high quality. The crop is the shortest in the history of the United States, and it is often said, "Well, it will be of an extra good quality

then." That is a mistake. Give me a tree comfortably filled, or well filled, and normal conditions and I will always pick from it the fanciest apples. Because of the shortness of the crop, prices have been high for extra fancy fruit. It was thought last year that the maximum had been reached when 72's, or larger, in Spitzenbergs sold for \$3.10 and \$3.15 per box. But this year they have gone even higher, these grades bringing in the Willamette Valley \$4 and \$5 per box. But we do not imagine that these high prices will continue, and are gradually working toward the English market by top-grafting into Yellow Newtowns.

There has always been a chance for discussion as to the causes of the coloring of apples, and Professor Van Deman has lately gone on record as saying it is a matter of soil and the availability of its constituent foods. I think the great professor would revise his opinion if he were long a resident of Oregon. Soils, situation, elevation, moisture, and many other considerations may affect, but the inconstancy of coloring year after year on the same trees would not bear out the theory. In our valley, if we have early September rains quickly followed by frosts, as is our usual experience, we don't bother much about the coloring of our apples, in any situation. If we miss either of these conditions we are standing a-tiptoe until late in October before we can commence picking, for we pick our apples when they are ready, be it October 1st or November 21st.

It would hardly be fair to the Willamette Valley, with its sweep of over a hundred miles of rolling hill and prairie, its wealth of woodland witcheries, this garden of the Hesperides, along whose slopes might have been borne the golden apples that won Atlanta—it would hardly be fair to that beautiful valley to ignore its wonderful adaptability to the growing of other fruits than high-grade apples. This valley is a natural haven for tender cherries, those delicate varieties native in the south of France. Then, too, in the Willamette Valley have been originated the greatest cherries of the world to-day, with the single possible exception of the Napoleon Bigarreau. The Bing, the Lambert, and the Hoskins are an unbeatable trio, as many of you know. Unbeatable for their beauty, their high flavor, and their enormous size. I remember when Mr. Hoskins sent some early specimens of his seedling cherry to the Department of Agriculture at Washington, he received an acknowledgment about as follows: "The plums you sent me must have been very fine and large, though they were delayed so long I could not test them as I would have liked." Plums will not stand long delays.

The Lambert, the Bing, the Hoskins, and the Royal Ann, as grown in our valley, are certainly revelations to the connoisseur of fine fruits.

And then our Bartlett pears! The juiciest, the most meltingly delicious Bartletts in the universe, as many of you know who have eaten them in their habitat.

Many fruits succeed nobly in this great valley, but our high-grade apples, our great quartet of cherries, and our Willamette Valley Bartletts are surpassed by the fruits of no clime under the stars of God.

Ladies and gentlemen of the California State Horticultural Convention, you will have noticed that in the methods of orchard culture I have outlined, I have followed implicitly the best traditions among the handlers of orchards in California. In many respects orchard work in our valley is *sui generis* and there are no blazed trails to follow. We must fight our own way through the woods. But our best methods are imitations, and, perhaps, poor ones of Californian models. How closely we have followed your work and how well we have profited from that study may best be judged by inspections afield; but you can guess at the result by what I have told you of our operations. For whatever success we have achieved we have the fruit-growers of California, our teachers, to thank.

You will note here and there in what I have said a disposition to be wary of scientific terms and theorems. I have always noticed that when a layman mixes science with horse talk he soon becomes fuddled. So I am a little chary of the jingle of scientific phrases. But I do not wish to be understood as speaking slightly at any time of the conclusions of scientific experts in horticulture. The latest horticultural literature, the latest discussions and deductions of horticultural scientists, are ever at our right hands. We pore over them by night and by day. If it were not for these helps from an army of thoroughly unselfish, thoroughly equipped scientific men, we apple-growers would be in the mires of Despond before another morrow. Speak slightly of these men! Ah, no; you shall never hear me do that. I could never hold them lightly. But so many bits of evidence are stumbled upon by the practical observer, the man who fondles his trees in the morning, calls them by name at noon, and gives them a "fare ye well" at night, bits of evidence that seldom, if ever, are presented to the scientist, that we may perhaps be pardoned if we form opinions that at first glance would seem to be heretical.

The intensity of the labors that go to make up the technique of orchard operations, labors that are imperative if we would even approximate our standards, labors that completely absorb the time and attention of the grower, is more than compensated for by the joys of association with our trees. Well-cared-for apple trees are, indeed, sociable fellows, always obliging and ready to do us favors for our attentions to them, heartily responsive to each fondling touch, courting the sprites of earth and air to fill their fronds with fruitfulness in compensation for our watchful guardianship. Alert companions, indeed, are they to one who understands their language; to one who rejoices in the fact that the vital essence throbbing within them is the same life

which thrills his being and has the same probability as his essence of enduring into Eternity—if there be such a state; to one who feels that his trees may possibly glow with an even greater prescience of that Eternity than he, unconscious though they seem to be. Such an one can not pass a thrifty Spitzenberg without giving it a word of greeting, a tender glance or a sympathetic touch. From every glance, from every touch, such an one will catch a rapture that never stales. It is the ever new, the old, old witchery of apple-growing—aye, more, it is the very apotheosis of orchard culture.

MR. BERWICK. Mr. Chairman, before the gentleman leaves the platform I should like to express our enjoyment of his very scholarly, poetic, and sympathetic address, and I should like to ask him a question or two. The one is, a point that is new to me in his treatment of the apple—the washing of the apple. I should like to know when that takes place and by what machinery he accomplishes it.

MR. LOWNSDALE. We have of late years been using a good deal of the arsenate of lead as a spray, which adheres to the apple and is a little difficult to rub off, and there is more or less dirt; sometimes our apples are on the ground and otherwise they get dirty, so we have tried various methods of cleaning them, and we find that it is absolutely necessary to clean apples before they go into a warehouse, because any lime, any spray adhering to the apples, as soon as the apple begins to sweat robs it of luster, and if allowed to remain until the apple throws out its oils, will absolutely dim the luster so that it will not be brought back by any process. So we have specially constructed washers with circular brushes under water, and sizers, so we size as close as we can. The washing is done immediately on receiving the fruit from the orchard. The apples are brought in from the orchard and dumped into a vat of water, which permits of no bruising whatever. The water supports the apple, and it will not bruise in the least. Then centrifugal motion produces a swirl that leads the apples in and on to a series of brushes that revolve; the apples then come to the outlet of the machine and are taken up by an automatic dipper and thrown into the hopper of a grader and sized; they are then taken away, assorted as to varieties, and put on lath trays. These trays are run out into the warehouse, stored thirty high, and left until after the first of January.

MR. BERWICK. Are the sides of the machine simply plain wood?

MR. LOWNSDALE. The sides of the machine are stationary brushes, so that the apples revolve against them and against the bottom, and there is also a line of brushes over the top. All the open space would be about a foot in which the apples revolve, and that is covered by another layer of suspended brushes that move as the different sized apples run under them; but those back of the machine are rigid, stationary brushes.

MR. BERWICK. Regarding fertilizing, what quantity do you use per acre?

MR. LOWNSDALE. 130 to 160 of the two.

MR. BERWICK. Drilled in or broadcast?

MR. LOWNSDALE. Broadcast.

MR. MILLS. Would it not be better not to wash the apples?

MR. LOWNSDALE. No; apples should always be washed before going into storage. It is a mistaken idea that an apple will deteriorate if washed. The better you clean an apple the longer it will keep in storage. It is absolutely necessary to remove that dirt, or the luster is gone. Then as soon as the luster is gone, the keeping quality of the apple is gone. The luster depends upon the oils that are secreted. If that moisture is taken care of by proper handling, it will form an oil on the surface of the apples which will keep them a long time. It will be impossible to form that oil if the apple is dirty.

MR. CRANDALL. I wish to ask if this question of washing for the long keeping of apples is not almost contradictory to the general law which we have been observing, that in any way removing the natural bloom from fruit will cause its early deterioration?

MR. LOWNSDALE. I am not prepared to answer that exactly. As I have hinted in something I said, this is the result of long experience, of many experiments both ways, and I can not say what influence the retention of the bloom on the apples would have in reference to their keeping qualities. I am sure, however, that I am absolutely correct in the statement that apples in our valley will not keep as long if they are not washed as they will if they are washed and put away. That is as far as I care to go.

MR. MILLS. How long must you handle them to eliminate any decay in the fruit?

MR. LOWNSDALE. After they go on to the trays they are never touched until they are packed.

MR. MILLS. How about the percentage of loss?

MR. LOWNSDALE. If we pack them about the first of January I would say about five per cent; if they are left until March, about ten to fifteen per cent. Not all will decay, but they will not be marketable apples. We may have to dry a portion of that fifteen per cent, but by the middle of March there would be ten or fifteen per cent.

MR. MILLS. Is that for the ideal handling which you have described, or is it the general result from the average farm?

MR. LOWNSDALE. That is the general result.

THE CHAIRMAN. There is a request from the audience that Mr. Frank Femmons read a short poem which he has on the apple.

THE APPLE.

BY FRANK FEMMONS, OF HOME ORCHARD.

That maxim old, so often told,
 "We live by what we eat,"
 Is true to-day, in every way,
 So true "'tis hard to beat."

'Twas old I know, long years ago,
 We only need remind,
 Lest we forget to follow yet,
 A rule that's ever kind.

To keep in health, with little wealth,
 Through days as they come 'round,
 'Tis simply this, Ah, what a bliss!
 I'll tell it as I've found.

Some apples eat, both tart and sweet;
 If small, then two or more;
 First peel the skin, quite neat and thin,
 But do not eat the core.

Of changing stripe, when fully ripe,
 A golden, green or red,
 A good one choose (or you may lose,
 By beauty's cheek misled).

Whatever hue that pleases you;
 One juicy, rich and fine—
 With flavor rare—without compare,
 A lover knows the sign.

At morning's meal, when you may feel
 The need of some rare wine,
 The apple fair is far more rare
 Than vintage from the Rhine.

To gods who feast, from west to east,
 Or 'neath the tropic sun,
 Our apples bright, by Nature's right,
 Are first with every one.

Their juicy flesh, so crisp and fresh,
 Is flavored from the dew;
 The morning bright, the sun's clear light,
 And evening's brightest hue,

Are blended there, with love and care—
 The richest given wealth;
 By angel's hands, through all the lands,
 To bless the world with health.

And when they're stewed, by hands not rude,
 In country or in town;
 In dumplings warm—in pastry form,
 Or baked to waxy brown,

A little cream may add a "dream,"
 Ah! who could ask for more?
 Till tarts and pies, in visions rise,
 Through good wife's pantry door.

THE CHAIRMAN. Next we will have a paper on "Pear Blight and Its Control," by Mr. Howard Reed.

MR. REED. Mr. President, Ladies and Gentlemen: We have had so much of poetry and good feeling here this afternoon that I feel sorry that I have a paper to read which has in it so much of disaster and heart-ache on the part of some of our fruit-growers, including myself, but the thoughts that I give you I speak from my heart, at any event.

PEAR BLIGHT AND ITS CONTROL.

BY HOWARD REED, OF MARYSVILLE.

"Pear Blight and Its Control" is a subject that the California pear-grower cares little about; it is something he wishes to dismiss from his consideration, something he prefers to forget, if one were to judge by the deplorable condition of most pear orchards in California to-day, and judging also by the half-hearted and unsuccessful efforts of the pear-growers to combat the blight. I have therefore approached the task of interesting this Convention in this subject with much misgiving. I am, however, spurred on by the thought that there yet remains much that might possibly be done toward saving the remnant of California pear orchards, and also her apple orchards, which are as yet practically unharmed by the blight. There are also the pear and apple orchards of our sister states of Washington and Oregon, which ought not to be allowed to perish.

Without going any further, I am frank to say that I have about as much hope of making a trip to the moon as I have of seeing the proper steps taken toward saving our pear orchards. I have long since resigned myself to the fate of losing my pear orchard before many years shall have elapsed. While I feel very strongly that this is an unkind fate and in justice never should have come about, still I would not have you regard me as a common scold because of the criticisms I shall make of those authorities and those conditions which I deem responsible for this great misfortune. Only to live in California is too glorious an opportunity, too great a blessing, for one to be cast down by one misfortune. I insist that I make these remarks only in the hope that some day, some way, a condition of affairs may be brought about, whereby it will not be permitted that such a calamity will overtake any other branch of our great industry, if there be any possible way to prevent it. In my opinion, California's pear orchards ought to have been saved.

The only genuine effort that has been made to stop the ravages of the blight has been carried on under the combined direction of the Federal and State authorities engaged in horticultural work. This work has generally been supposed to have been done under the Waite

system, and the failure of this effort has been by too many erroneously and unreasonably laid at Professor Waite's door. It is probably true that the pear orchards were doomed before Professor Waite had ever been invited to come to the State. The growers attempted to administer the pound of cure, but they had spurned the ounce of prevention.

Professor Waite is here and perhaps needs no defense at my hands, but I insist that this work has not been done under the Waite system. I well remember Professor Waite's advent into this fight and I know the line of action that he laid out. I feel safe in saying that in not a single county did the Horticultural Commissioners get behind him in this fight. I am led to believe that it is debatable ground whether or not the County Horticultural Commissioners have sufficient power to act in such matters without the authority of the State Horticultural Commissioner.

As far as I know, the State Horticultural Commissioner's office has never taken any active interest in pear blight. As a County Horticultural Commissioner and in my own interest, some few weeks ago I decided to find out what help could be had from the State Commissioner's office toward fighting pear blight in Yuba County, seeing what a fizzle the County Commissioners had made of their efforts along the same lines in the past. I wrote a letter to the State Commissioner's office in which I recited the fact that there were a number of commercial pear orchards in my vicinity, the owners of which were making an expensive and determined effort to control the pear blight therein. I further recited the fact that in Yuba County there are a number of neglected and abandoned pear orchards, which are teeming with pear blight and which are a constant and terrible menace to those who are endeavoring to save their properties from this destructive agency. The letter concluded by asking the State Horticultural Commissioner for his authority to prosecute the work desired to be done. This letter was signed by myself and Mr. Harney as County Horticultural Commissioners. In reply we received a letter in which we were thanked for our annual report as County Horticultural Commissioners and in which our request for power to act was absolutely ignored. This experience confirms my belief that the State Horticultural Commissioner's office wants nothing to do with pear blight. This office, I believe, has not given as much assistance to Professor Waite as have the different County Boards, none of which has been of any practical value.

Now, strange as it may seem, the parties most interested, the growers themselves, have in many cases met the proffered assistance of Professor Waite and his fellow-workers with bitter antagonism, if not open hostility. They have attempted to belittle his efforts, have tried to poke fun at the Professor and his work, and have successfully held up and nullified the Waite campaign against blight. But I am not

seeking a quarrel with any one. I simply seek to draw your attention to the weakness of a system that allows an individual to maintain his property as a menace not only to his own interest and his immediate neighbors', but to a great industry of our State.

Another thing that has interfered with the success of this campaign has been the woeful inefficiency of many of those growers who have tried to make a stand against the blight. Moreover, the inefficiency of the help engaged by the growers in this fight has been surprising and discouraging in the utmost and has in itself rendered impracticable a demonstration of the efficiency of the Waite system.

Now, it seems to me, that it is clear that there has been no fair test of the Waite system, for it matters not how well such work may be done in one orchard, such work is largely vitiated if the work fails of being done in adjoining orchards.

Consider, if you will for a minute, my own position in this matter. My living and my future and that of my family are in a very large measure dependent upon my efforts to control the pear blight. By dint of hard work and strict adherence to the Waite system, and in spite of having been forced to work in gum boots for several months during a crucial period of the fight last spring, I have succeeded in maintaining my orchard with not more than a ten per cent loss of bearing surface.

Now then, I naturally wish to save myself from further depredations of the blight. I find myself surrounded on all sides by orchards fairly rotten with the blight. I find my appeals for aid calmly ignored. And yet the State recognizes the justice of my claim, for laws there are in plenty, but the system of carrying out these laws is so puerile, so ineffectual and so cumbersome that I have no hope of the aid that the State intends to render me.

This leads me up to the question that I desire to ask of this Convention. If I were a lawyer I suppose I would call it a hypothetical question. Supposing that, years ago, before the pear blight appeared in California, we had eliminated politics from the office of the State Board of Horticulture and that public sentiment had demanded and succeeded in placing in this office the very best talent available at whatever cost; supposing, for instance, that our good friend Professor Waite had been Horticultural Commissioner at that time; supposing that his enthusiastic determination and wonderful ability had been supported by sufficient laws and an adequate organization of his official forces, do you suppose that when at length pear blight had "reared its horrid head" in California's fair fields, it would not have been immediately stamped out, if not for all time at least for a generation or more? That is the time when the ounce of prevention should have been applied. And pear blight may not be an isolated case. Even now

the citrus industry seems to be menaced by a foe demanding the same heroic treatment that should have been applied to pear blight, and we know not at what time some other pest may appear to work destruction to some other branch of California's greatest industry. This peril will ever be with us; we can not escape it; we will have ourselves to blame if we have not learned our lesson. We, as fruit-growers of California, should stand together and have placed in the office of State Horticultural Commissioner the biggest, the brightest, the best equipped man the world affords for that office to-day. We should fortify the office with all necessary laws, with a sufficient organization, and back it up with a public opinion that will tolerate no opposition.

California is the great orchard region of the world, and we should guard well its interests that our enemies may be kept from entering in, and that we may enjoy the full measure of prosperity to which our glorious climate and fertile soil entitle us.

In preparing this paper the detail of pear-blight work did not impress me as being what would most interest this Convention, and if you feel that you would like to hear a recital of the way I actually handle the blight, I feel prepared to give it extemporaneously at this time or to any interested party in private conversation at a later time.

MR. BOOTH. I took hold of the pear blight some four years ago and I have been cutting ever since. Probably three or four feet below where it is cut off the bark becomes black and dead, and if you cut off the bark a sour smell comes out of it and the wood is rusty. What is the cause of that?

MR. REED. The cause of it probably is that the cuts were not deep enough to rid the tree of the blight.

MR. BOOTH. How are we to account for the blight being down in the trunk six to eight feet from the dead wood?

MR. REED. It went in through a sucker or where the tree was injured in cultivation. You can not always tell how it gets in. Sometimes there will be a little flower start out and the blight will go in.

MR. BOOTH. You understand those trees have bodies from eighteen to twenty inches through?

MR. REED. Yes; I have seen little flowers come out on big trees and in a few days the flower would fall off and the blight would go in through that. There is nothing mysterious about the blight; there is a cause for every bit of it.

MR. KING. I would like to ask, would the gentleman, from his experience, advise that no further planting of pear orchards be made in California because of the serious condition in the pear-blight situation?

MR. REED. My advice to a prospective pear-grower would be not to plant out enough pear orchard so it would cripple him financially in the event of failure. If he knows he can always get some one to handle the orchard without outside help it is a good investment. I have a thousand young trees myself, but I am not going to put out any more. If a man wants to engage in the fruit business on a large scale he had better take something else.

THE CHAIRMAN. We next have a paper from a gentleman who needs no introduction, Mr. George C. Roeding of Fresno, entitled "The Smyrna Fig for Profit in the Interior Valley."

MR. ROEDING. It is with some hesitation that I appear before you to-day. I have read and spoken so many times before on the Smyrna fig that I hope you will be quiet during this essay, and if you do so I will reward you by giving to each of you one carton of figs. (Laughter.)

THE SMYRNA FIG FOR PROFIT IN THE INTERIOR VALLEY.

BY GEORGE C. ROEDING, OF FRESNO.

When Governor Gillett appointed J. W. Jeffrey to the position of State Horticultural Commissioner, I said to myself, "Now the old wheel horses will be turned out to pasture and given that rest and quiet to which they are certainly entitled." Hardly had the thought grown strong enough to become a conviction, when I received the usual fiat from Secretary Isaac, of the State Commission, that Smyrna fig culture was the subject on which I was to orate and grow eloquent at this meeting. Needless to say, I good-naturedly protested and endeavored to convince Mr. Isaac that the Smyrna fig had been discussed by me on so many previous occasions at annual meetings of fruit-growers that I thought it was worn threadbare, hence those who are compelled to endure me again will remark, "Well, it is the same old story—Berwick on parcels post, Stephens on transportation, Roeding on figs, etc. Why don't they kill off some of the old-timers and give us something new?" True, I haven't given you anything on the fig for several years, nevertheless those who have known me from the time I was a woolly-headed boy appearing before you, and had it hammered into them, time and again, that I am the fig man, to be inflicted once more, when I am rapidly approaching the time when I might in all seriousness be placed in the class of men who sit in the front row of a theater drinking in the beauty and sinuous grace of a light opera with its accompaniment of pretty girls and—well, it is certainly crowding the mourners; but to revert to my subject, from which we are sadly digressing.

Let me give you a bit of personal history. I am a native son, born and reared in heroic San Francisco. In the nature of things it must seem strange to you that I ever consented to allow my father to plant me in Fresno and keep me there until I became, as you see me now, a full-fledged son of the soil. My father, a banker and merchant, like many another man, had a wholesome horror of his own particular vocation, and often remarked, as I can well remember in my younger days, that being a bank clerk was all very nice; the salary was not to be sneezed at; the hours were short, and the young men had leisure time to watch and admire the pretty girls (for which you know San Francisco is famous) as they tripped down Kearny street. His sons should engage in other lines, and he has successfully carried his views into effect, for I, as well as my brothers, in spite of our desire to have genteel positions which would give us an opportunity to see more of the gentler sex, were compelled to work with our hands for a living, and our inclination to become members of his staff in the bank was sadly shattered. This briefly narrates my introduction into the realm of horticulture, and to-day I am pointed out, in these annual meetings, as the "Fig Man."

Publicity is not always pleasant to a sensitive nature. Recently I was in a suburb of Los Angeles making a purchase of seeds from a man who did not happen to know me personally. When I gave him my name, he looked at me in surprise and said, "You are not the Calimyrna fig man, are you?" Evidently my appearance when traveling belied my occupation. As my friend, Professor Wickson, remarked in one of his graceful notices a short time ago, I may look like a *bon vivant*, but, to the contrary, I am a painstaking, energetic young man, who really works for a living. Before taking my departure from Los Angeles, I was approached by a reporter who desired an interview about my experiences in Smyrna. I objected, saying I had already written so much about my trip that any remarks would only be a repetition of what had already appeared in print many times. He insisted, however, and I finally consented. The result of that interview was anything but edifying. The artist who accompanied the reporter drew my picture, and, sad to relate, I looked very much as if I had had a set-to with one of the Southern California bug inspectors. So much so was this the case that my friend, Frank Wiggins, Secretary of the Los Angeles Chamber of Commerce, cut out the clipping and mailed it to me with the anxious inquiry, "George, were you all O K when this was taken?" And what the reporter said was even worse. Among other things, I was put down as a United States Commissioner—of what it did not say, but presumably of figs and fig bugs. An amusing experience occurred with a reporter in Fresno several years ago, a new man on one of our leading dailies, who was instructed to interview me on

the fig. To his query for information, I replied that there was nothing new. In the course of our conversation he wanted to know if I had discovered any method of eradicating the fig insect. I looked at him for a moment, thinking he must be one of Jeffrey's Los Angeles bug inspectors who are constantly on the warpath for insectivorous gore, and then catching my breath I blurted out, "Jehosaphat, man! Eradicate it! Bless your benighted soul, I have for fifteen years plowed through the Agricultural Department at Washington and harrowed every fruit-growers' convention in California for an equal length of time, in an endeavor to import the bug and get it to 'bugging' in my fig orchard." The story, of course, went the rounds of the press, and as for the boy, I believe he was last heard of delivering a lecture on "If bugs were as big as elephants, what would happen to the quarantine office at San Francisco?"

However, I guess I am an old-timer. Well do I remember my first paper on the Smyrna fig, read in Marysville before the Convention of 1891. It was at a time when the whole subject of caprification was regarded as a myth, and its followers (and there were but few) as self-illusionized cranks. My paper was prepared with the utmost care, my experimental work being carefully detailed, hence I expected it to be received in a manner befitting its importance. How rudely my air castle was shattered! When the paper was called for, I happened to be out, and as it was all Greek to the man who read it, and being rather long anyway, I had the satisfaction of listening to remarks like these: "I wonder if he will ever get tired?" "Who is that fellow any way?" "Say, isn't he long-winded?" "Oh, cut it short." The agony over with, I silently said "Amen." Let me tell you, my friends, if you ever get a bee in your bonnet that you are a great writer and are on the road to fame, just let some one else read your essay and seat yourself among people who do not know you and listen to their criticisms. You will say, "Me for the soil; I'll leave writing to men and women who farm on paper with lead pencils."

My paper was followed by one written by the late B. M. Lelong, then Secretary of the State Board of Horticulture, in which the whole subject of caprification was held up to ridicule. In the annual report of the same year, the so-called male and female *Blastophaga* were illustrated. The male happened to be the female, and the female shown was in reality the parasite *Philitrypesis*, which fortunately for us failed to become established when the fig wasp was introduced. Prof. C. V. Riley, then Chief of the Division of Entomology of the U. S. Department of Agriculture, and who was enthusiastic in his belief in the ultimate success of Smyrna fig culture in California, severely criticised Mr. Lelong later, for his lack of knowledge on this subject.

I do not wish to burden you with all the details relative to the final

and successful introduction of the fig wasp, except to say that it was sent to me several times by correspondents, and although the insects issued from the figs, our capri figs were evidently not in condition to receive them, and they failed to establish themselves. For years I had endeavored to interest various secretaries of the U. S. Department of Agriculture in the subject, without success. It was not until my friend, B. N. Rowley, now deceased, proprietor and editor of the *California Fruit-Grower*, who, by the way, was also skeptical on the subject of caprification, finally consented, after my repeated demonstrations that there was something in it, to bring the matter before the State Board of Trade. I sent him specimens of figs produced by artificial pollination, capri figs, etc., and he delivered an address on the subject. As a result of this conference a committee was appointed, consisting of Messrs. Rowley, Maslin, and Filcher, to draft a letter to Hon. James Wilson, Secretary of Agriculture. This letter went into the subject fully, and as a result Mr. Wilson promptly communicated with Dr. L. O. Howard, Chief of the Division of Entomology, and Mr. Walter T. Swingle, Agricultural Explorer for the Division of Seed and Plant Introduction, who was then studying in Italy in the interests of his division.

Several consignments of insects were sent me in March and April in the years 1898 and 1899, and I took care of the infested figs, placing them under trees which had been previously inclosed in canvas tents. Former experiments along the same line in earlier years had always resulted in failures and I anticipated no better success with these later shipments, but nevertheless determined to give the insects every care. Much to my surprise, in June, 1899, I discovered by accident that the wasp, after so many years of uninterrupted effort on my part, had finally consented to be listed among our prize immigrants.

Since success often leads to forgetfulness, I desire to say a few words in honor of a man who never lost faith in the future of this industry, but who devoted time, money, and land for the purpose of carrying out his experiments. This was E. W. Maslin, who did not complete his work, because he sold his ranch to engage in other pursuits. It was he who, as far back as 1885, fully realized the inferiority of figs grown in California as compared with the world-famous Smyrna figs. In 1885 and 1886 he purchased the best dried Smyrna figs the market afforded, washed out the seeds, planted them in boxes, and when the seedlings were large enough, put them out in orchard form on his farm in Loomis, Placer County. Much time and care were bestowed on the trees, and Mr. Maslin looked forward with fond hopes to a successful realization of his well-directed efforts. As the trees grew, Mr. Maslin got the impression that all were of the same type, and my recollection of the orchard in its infancy coincided, as near as I can

remember, with his views. The following is an extract from an essay read by him before the Twelfth State Fruit-Growers' Convention held in Fresno in 1889: "One fact to which I wish to call attention, and a very important one, in relation to the necessity of caprification, is that the leaves of all the fig trees grown from seed and obtained from Thurber are identical in type." The orchard had almost passed out of my mind, and in fact I thought it had been dug up and destroyed long before I succeeded in establishing the Blastophaga, when my attention was attracted to a fig orchard near Loomis, while seated in an observation car of a train Eastward bound. It dawned on me, however, that what I saw was the remnant of the old Maslin orchard in which, in spite of the fact that it had been sadly neglected for a number of years, many of the trees were alive and growing. The insect had already been introduced into the capri figs of my friend, D. Van Lennep, of Auburn, and he kindly consented to send infested figs to this orchard at the proper time. After the insect became established, I visited the orchard several times and made a careful and complete record of it, and although there was not one third of it standing, seven eighths of the trees were capri or wild figs, and hardly two of these are alike, entirely upsetting the ideas advanced by Mr. Maslin in 1889.

Another prediction made by Mr. Maslin read as follows: "We are on the threshold of entering upon a great industry. Fig culture, I confidently believe, will in five years rank in importance with that of the raisin, prune and grape." You were right, old friend, but you miscalculated the time, for if you had said twenty years instead of five you would have been about correct.

When I demonstrated that our little friend, the Blastophaga, had concluded to dwell with us and harvested my first crop of figs of any importance in 1901, I thought I had accomplished something which would benefit California, for I had expended thousands of dollars in my investigations, and had taken care of a sixty-acre fig orchard without deriving one cent from it for a period of fourteen years. I had counted too securely on my success and soon learned that, even after I had demonstrated that California Smyrna figs were all I represented them to be, the public was doubtful. Many thought the trees would not bear and that the insect would soon disappear. My experience is only a repetition of what others have been compelled to pass through before their efforts received recognition. To-day, many of the old trees of the San Francisco *Bulletin* importation of 1882, which have been allowed to grow practically forgotten and uncared for, are producing fine figs, much to the surprise and mystification of their owners, who had never seen figs on them before.

Do you know what the general public says of me at home? That my orchard never bears; that Smyrna figs are a failure in the San

Joaquin Valley; and furthermore, that I don't care whether they bear or not, because I have too much money any way. It reminds me of an experience of mine in Santa Rosa. I, a stranger, spoke to several people for the purpose of learning how Luther Burbank was regarded, and to my surprise the answer was that "he either had wheels or was crazy." And Burbank is the biggest advertisement Santa Rosa ever has had! If the narrow-minded only knew what was good for them and their town, they would never lose an opportunity of extolling Burbank's many excellent qualities, instead of having their little hammer out, trying to knock him.

How ill-founded have been the reports regarding my orchard, is shown by the following facts: Since 1901, it has never failed to produce a crop, and since 1902 the crop has not been less in any one year than fifty tons, and this year we have harvested ninety tons. Had I known seven years ago what I know to-day, my crops would have been thirty per cent larger annually than they have been; but changes in a matter of this kind are not brought about in a single year or even several years, so that it took some time to bring about the desired change in existing conditions.

I learned, when I visited Smyrna in 1901, that their knowledge of the Blastophaga was not only very limited, but also that people who should possess information on a subject of such vital importance to one of their great industries knew far less than I did. Had I not gone fully equipped with specific information, I would have returned more mystified than when I went.

Those who have planted orchards in recent years have had the benefit of my experience and observations; thus there is no possibility of their making any mistakes, providing my instructions are followed. If any one is in a position to discuss this subject intelligently, I think I am. My investigations in Smyrna, my observations at home, and finally the fact that my orchard has brought in returns amounting to over \$40,000 since the wasp has been established, is sufficient evidence for insisting that the culture of the Calimyrna fig is an unqualified success. I want to say to you, ladies and gentlemen, that the successful prosecution of this industry has been my life work. I believe that Smyrna fig culture has a great future not only in California, but also in other countries with climates similar to those of our great interior valleys.

Do not think for a moment that the man who withstood ridicule, even after he had demonstrated that Smyrna figs could be produced by artificial pollination; who made a desperate and successful effort to prevent the digging up of the sixty-acre Smyrna fig orchard on the grounds of the original Fancher Creek Nursery (before he came into possession of that place); and who finally, after repeated failures, suc-

ceeded in establishing the little wasp, on which the whole foundation of Smyrna fig culture rests, is going to give up one iota of what he has achieved by his own initiative and against great odds. In the language of the poet, "He ain't built that way."

To most of you who are familiar with our horticultural development in its early history, the reason is obvious why fig culture has not kept pace with our citrus and deciduous fruits. All the California figs belonging to what is known as the Adriatic type, and which are produced without the agency of the fig wasp, are decidedly inferior from every point of view to the Smyrna type. This is a fact well known to the trade, and is really the cause for the lack of demand for our dried figs. The output of California dried figs has never exceeded 2,500 tons annually, while the annual output of Smyrna figs from Asia Minor in the fig district of the Meander Valley (84 miles long and only a few miles wide, where all the Smyrna figs are grown) amounts to 100,000 camel loads, or 25,000 tons—more than ten times the quantity produced in this State. Do you know that thirty thousand people are engaged in handling that one crop during the harvesting season, and furthermore that the United States is to-day the greatest consumer of these figs, and all this in spite of the duty? And do you know that California is destined, by reason of climate, soil, and the establishment of the *Blastophaga*, to wrest this trade from Asia Minor and divert it to our own people? Is this not of itself an irrefutable answer in the affirmative that Smyrna fig culture is not only feasible but highly profitable in this State?

MR. BOOTH. I would like to hear from our old friend, Mr. Maslin, on this subject.

MR. MASLIN. Mr. President, I am very happy to receive the compliment of appearing before you. It has been over a quarter of a century since I became a member and attendant of horticultural conventions. They say that a musician may take a string of his violin and if it is in accord with the bridge he may make that bridge tremble. And so I feel to-day that, after twenty-five years of intercourse with my fellow-horticulturists, they have struck a tone in my heart which I can hardly express to you—gratification at meeting so many intelligent men and the assurance that the horticultural interests of this State are on a firm basis.

I would like to add a little historical knowledge to the fig question. In 1884 I purchased a farm from the railroad company at Loomis. Mr. Rixford had introduced a large quantity of supposed Smyrna figs. All over the State they had proved a failure. In 1885 I sent to Mr. Thurber for a box of figs. He sent me a box and I sowed the seed in twenty acres. I reduced it to about six acres. On one occasion, some

*Questionable: Shinn got Smyrna fig
but no insects. I believe.*

time in the 80's, I went to Mr. Shinn's orchard near Niles. He then talked to me about caprification. I thought it was ridiculous, but I commenced to read on the subject. I did not believe it. I went out again and found what he supposed, and what I supposed, to be the wild fig. He cut it open and we found it to be full of pollen. Mr. Shinn had, before that time, imported the Blastophaga from Smyrna and had distributed it in the trees. We took that and introduced it into the Rixford fig. That fall fifty figs matured. Practice was above theory, and I was then persuaded that the Blastophaga was necessary.

On one occasion Mr. Rowley came before the State Board of Trade and exhibited a fig which he said Mr. Roeding had raised by the means, I suppose, of fertilization. We were asked then to introduce the question to Secretary Wilson, which I did; and after many letters, as Mr. Roeding said, he plowed and harrowed the said gentleman to do something. Finally Mr. Howard came out and saw me and said he was going to send the Blastophaga to Mr. Roeding. He received it, and that is the history of the introduction of the fig business. I have not from that day to this ceased to have the fullest confidence in the profit of the fig crop in California. (Applause.)

On motion of Mr. Crandall, duly seconded and carried, a vote of thanks was tendered Mr. Roeding for his generous contribution of figs.

In the absence of Mr. W. Herbert Samson, Secretary Isaac read his paper entitled "The Commercial Smyrna Fig," as follows:

THE COMMERCIAL SMYRNA FIG.

BY W. HERBERT SAMSON, OF CORNING.

The probable home of the edible fig is the fertile part of southern Arabia, where at present the capri fig is wild, and where there are no traditions of its introduction. From Arabia it was carried to Syria and the Mediterranean shores, and in the eighth century before Christ it was found all over Greece and formed an important article of food of both the rich and the poor. The Athenians, on account of their fondness for the fig, were nicknamed "sykophants" (fig-eaters), a name afterwards given to those spies who informed the authorities about the unlawful exportation of figs from Attica. In this province the best figs of ancient times were grown, and so necessary were they considered for home use, that their exportation was prohibited. This prohibition led to smuggling, and guardians and watches were appointed by the government to report those who violated the law. These guardians were called sycophants (from *sykon*, a fig, and *phainein*, to show), and the word became synonymous with the idea of a secret spy. From this usage of the word comes our word "sycophant."

Among the ancient Greeks the fig had a symbolical and mystic meaning, an emblem of fertility and propagation, for the flowers of the fig were hidden, while all other flowers were exposed to view. This peculiarity of the fig surrounded it with mysticism, and it became a sacred symbol in the festivities and worship of one of the Greek gods.

From Greece fig culture spread along the northern shores of the Mediterranean and Adriatic until it reached the southern parts of Italy, where it figured in Roman mythology, the infants Romulus and Remus having been reared under the "spreading crown of a fig tree." From Italy the fig made its way to Spain and Portugal, and with the discovery of the New World it obtained a foothold in all the countries visited by the Spanish and Portuguese missionaries. It is to the Spanish missionaries that we owe the introduction of the fig into California, the first trees having been brought here by the Franciscan fathers. These were the "Mission" or black fig, and this has been widely distributed all over the State.

The most delicious fig on the market, however, is the Smyrna, which derives its name from the seaport Smyrna, where these figs are packed and whence they are shipped to almost every country on the globe.

In 1882 the foundation of this great industry was laid in the Sacramento Valley by the late Governor Stanford. In the spring of 1882 the *Bulletin* Company of San Francisco imported 13,500 Smyrna fig cuttings. Governor Stanford was very much interested in this importation, the success of which was mainly due to his aid in facilitating rapid transit across the continent, and to the fact that he paid most of the expenses. His share of the cuttings were planted on his Vina ranch in the Sacramento Valley.

For the past seven years I have been somewhat interested in the Lob Ingir Smyrna fig, or Commercial Smyrna fig, as it is sometimes called. From my experience I consider it a great success in this State, particularly in the Sacramento and San Joaquin valleys.

This industry has the same disadvantages to overcome as new industries generally do. The greatest obstacle is the fertilization of this fruit, which seems to be hard for the ordinary man to understand. He will see the Blastophaga, or fig wasps, as they are generally called, coming from the capri fig. He will take thirty or forty of these figs and place them on a Smyrna fig tree, all at the same time, when perhaps three or four figs would give better results. In fruiting the Smyrna fig, the amount of fruit on the tree is the first thing to consider. Take, for instance, a tree twenty years old in good, thrifty condition. Eighteen capri figs are all that should be placed in the tree the first time, and they should be strung on at least three different strings and placed in three different places on the Smyrna tree. This should be repeated every five days until the profichi crop of capris

is exhausted. By so doing there will be very few, if any, of the Smyrna figs that will be over-fertilized, and this is what must be avoided. If too many wasps go into the same Smyrna fig they leave an over-supply of pollen on the female flowers, which causes the fruit to split open before ripening, thus deteriorating it in value.

Following is a description of the Lob Ingir Smyrna fig given by Gustav Eisen: "Lob Ingir; Bulletin Smyrna; Commercial Smyrna (California); Erbegli; Erbelli; Erbeili. Fruit large to very large, $2\frac{3}{4}$ inches wide by $2\frac{1}{2}$ inches long; decidedly flattened like an onion, being compressed in the diameter of stem to the eye; neck thin, distinct but short, generally straight; no stock or one very short; ribs heavy, uneven, knotted and branching; eye large, with numerous scales of amber tint, opened and about three sixteenths of an inch wide, so that the pulp can be seen through the opening; skin the color of beeswax, smooth and waxy, shaded greenish; pulp pale to dark amber; when unripe shaded red; no distinct iris; seeds large, flattened; tree a strong, spreading, but rather straggling grower, with heavy branches. This fig is the best type of Smyrna fig, and the majority of figs imported from Smyrna to this country belong to this variety. It is a distinct fig, and this and no other fig should be known as Smyrna, if this name is to be used at all. The promiscuous use of the name Smyrna fig can not be too much condemned."

MR. MASLIN. Mr. Roeding said, "How soon we forget." Mr. Rixford, in 1883, imported what was reported to be Smyrna cuttings. The *Bulletin* distributed these. The fig trees which Governor Stanford imported turned out to be what we call to-day the Brown Turk. I desire to state that Rixford of the *Bulletin* was the first man to introduce the Smyrna fig.

MR. ROEDING. I think, however, that Governor Stanford furnished the money to Mr. Rixford to bring the figs over. There are many of those trees growing to-day.

On motion of Mr. Berwick, duly seconded and carried, that two Vice-Presidents be selected by the Chair, the Chairman appointed Mr. Booth and Mr. Stabler as such Vice-Presidents.

An adjournment was thereupon taken until 9:30 o'clock A. M. to-morrow, the members, however, being invited to attend a reception and entertainment this Tuesday evening, tendered by the Women's Civic Improvement Club of Marysville and the Women's Improvement Club of Yuba City.

PROCEEDINGS OF SECOND DAY.

WEDNESDAY, December 4, 1907.

The Convention was called to order by President Jeffrey at 9:30 o'clock A. M.

The report of the Secretary was read by Mr. Isaac.

THE CHAIRMAN. If there are no inaccuracies in the report, it will be accepted without any further ceremony. Colonel Irish will probably be here shortly to read his paper. In the meantime, I have the pleasure of introducing Mr. Leonard Coates, who will speak a few moments on the Eucalyptus.

THE EUCALYPTUS.

MR. COATES. Ladies and Gentlemen: I am not at all prepared to deliver any address on this subject, but I understood from the Secretary that Mr. Walton was going to give us some little talk on the eucalyptus, particularly in regard to its local adaptation. I wrote him that I would be prepared to supplement his talk by showing a few different species of the eucalyptus and mentioning some of their characteristics. I had supposed that this would come up later during the Convention and that Mr. Walton would have talked to us first, but as a little time is at our disposal, I could just mention a few points regarding some of the timber varieties.

You know that at the present time there is a great deal of talk and discussion about the eucalyptus for all purposes of fuel and timber, hard woods, wagon work, and so on. Very little is known about this family of trees except with regard to what we know as the blue gum and possibly the red gum and one or two others to a more or less extent; but from all the reports—the Government reports and the Experiment Station reports—we find there are a great many other species, which while they are planted only a little here and there—a few trees—ought to be known more and ought to be planted more. The Government is from time to time issuing bulletins in regard to the planting and growing of these trees and also in regard to the different species and their characteristics and uses.

I have been interested in the eucalyptus for a long time, more or less, but recently it seems to be such a very important subject, and one

which will be one of first importance to the State, the raising of hard wood, not only for our own use but for export—there isn't any question about that—that the hardwood industry of California, I believe will supersede fruit-growing or anything else. It seems impossible that it should be otherwise. We have letters all the time from the East inquiring about the eucalyptus and how it grows in California, and whether the writers can get a supply. We find locally and everywhere that the price of hard woods for ordinary wagon work is advancing rapidly. It was only the other day that I had occasion to go to the local wagon shop to get some shafts made for an old truck. The man looked about and said, "The best I can do for you is to make some shafts out of blue gum, but as far as that goes it is better than any hickory I have ever worked up." There is in San José a planing mill run by a man who has worked in hard woods for forty years—a great many years in the East and for twenty-five years in this State. He is working almost exclusively in eucalyptus and, of course, mostly the blue gum, because he can not get others; but for almost all hardwood purposes, flooring, etc., even the blue gum, which is not considered one of the best varieties, is better than we have any idea. Its seasoning, of course, is a subject of which we know but little; yet all of those matters as to the methods of seasoning the eucalyptus properly will be published in bulletin form by the Experiment Stations and the Government.

I have nineteen species of eucalyptus here—those which are best known. It is a difficult matter to describe these, because very few are known otherwise than by their botanical names. Some of the species are known only by the name of *tamara*—that is, ordinarily, in a commercial way. The blue gum we all know. The two varieties which were planted years ago, and those which we often had in the largest quantities, are what are known as blue gum and red gum. I can plead guilty to having sold a great many of this variety for red; but it is not the red gum, although similar to it. It is not as valuable as the red gum proper, although it is a much more rapid grower.

I remember at Hanford last year, in driving around during the meetings of the Convention, being shown two specimen trees of this variety. They are probably the largest specimens in the State, over 200 feet high and marvelous in size. But the red gum with me outgrows in height the blue gum and it is hardier; the tenderest growth is not hurt by frost.

One of the varieties here is very different in growth from others we have. It is particularly valuable for telegraph poles. Then there are several varieties—Mr. Roeding can corroborate me in that—that grow particularly well in the warmer portions of the State. From actual experience, the sugar gum is more adaptive than the bulletins

and reports would give us to understand. It is spoken of generally as better suited to the coast counties—the mild, moist climate.

I was in Oroville some months ago and found a magnificent specimen growing there, and certainly if it will grow there it will stand plenty of heat and a dry atmosphere, so it will be one of the most valuable we have because of its known properties for hardwood purposes.

The blue gum has been used perhaps more than any other medicinally for oils and so on, but we find from reports made by the medical papers that it is too strong; there is something in it too powerful for antiseptic purposes, so they use the lemon-scented gum.

THE CHAIRMAN. Mr. Coates, will you please tell what you consider the best hardwood eucalypts we have; just the names, please, of about three or four, so that if anybody wants to plant varieties that are successful they will know what to plant?

MR. COATES. Probably the best hardwood varieties would be the red gum (*rostrata*), the sugar gum (*corynocalyx*), the *crebra*, or shallow-leaf iron bark, and this *pilularis*—black butt. Those are as valuable as any, so far as we know, for general purposes of hard wood. All of these have particular and special characteristics and uses, but the matter may be taken up again later, possibly. It is a sort of technical subject, really, the describing of these botanical varieties.

MR. CRANDALL. Might I not suggest that Mr. Coates be asked to write out a statement, just such as he has given us, to be included in the report? It is a very important matter, and he could submit it to the Secretary to be included in the report.

THE CHAIRMAN. I think the Secretary will take the suggestion without any further action. I now have the pleasure of introducing Col. John P. Irish of San Francisco, who will address you on "Labor in the Rural Industries of California."

LABOR IN THE RURAL INDUSTRIES OF CALIFORNIA.

BY COL. JOHN P. IRISH, OF SAN FRANCISCO.

Mr. Commissioner, and Ladies and Gentlemen: The labor situation in the rural industries of California is being dictated and victimized by theory. The orchard and vineyard work of this State and the primary processes of labor necessary to be performed in other rural production have been settled often by the metropolitan press and by those who produce nothing but theories, and while this theoretical and newspaper settlement has been going on, the labor situation in the rural industries of California has for the last twenty-five years been continually growing worse and more uncertain. You who are practically engaged in

rural production of different kinds know that in many of the important and necessary primary processes of that production it is impossible for you to get reliable, persistent, and faithful white labor, so called, to perform these processes. In all of the stoop-over work of this State white men are not found. It has been tried by the raisin-growers of Fresno for twenty-five years, and no man there has yet succeeded in getting reliable, long-legged, long-backed white men who will work all day in a stoop-over position, or squat with heads down, in a temperature of 110° , and save the raisin crop. All of you know that this year, if you had had a bumper crop of fruit of any kind on your trees or your vines, a large percentage of it would have been wasted for lack of labor to harvest it. The fruit-growers of California have done well during the past season, because they had a small crop and a large price.

The importance of the fruit crop to every country community and to all of the business operations of every country community is shown by what was told me by one of your most successful farmers over in Sutter County last night. When I asked him if the local banks had been in distress, he said no, because the crop this year had brought a big price, had been sold, the money paid for it and put into our banks, and neither banks nor people had felt any of the monetary stress and pinch that have been felt so badly in other parts of the United States. So that the harvesting and marketing of your crops are of the greatest importance to every form of business in every one of our rural communities and in every one of our rural centers of population, like Marysville. Suppose this year you had had to harvest a bumper crop, that you had had to harvest twice or three times or four times as much fruit, the same being on your trees or vines, to get the same gross result in money. You would have found it impossible, if my information is correct—and I have been widely informed throughout the State—you would have found it impossible to secure the labor to harvest and market your perishable property successfully. The fruit on tree and vine does not wait for a crew to go off to town Saturday night and get drunk and straggle back Monday and Tuesday, and some of them not at all. When your crop is ready for harvest and to go into market it must be cared for. This labor that is not willingly performed by white workingmen is done, and has been done in the past, accurately and faithfully by Asiatics, and especially by Chinese. (Applause.) The short-legged, short-backed Asiatic performs all of the stoop-over work, the squat work. He stands any temperature. He works in every sun and clime, and as far as the Chinese are concerned they faithfully perform their contract and keep their promise, whether the eye of the employer is on them or not. (Applause.) The first inroads made upon that supply of labor were made under the shelter of the cry of "Cheap labor." You are not concerned in the cheapness of the labor, but in

the fidelity and dependability of that labor. Any raisin-grower in Fresno will tell you that you may pay white men \$5 a day to work in that temperature and at that stoop-over task and they may work one day and that is all. You can't pay them wages enough to make them stick to it and save your property.

This labor, performed in times past by the Chinese and in a very much modified volume now by those who are left, was non-competitive with white labor, because it performed these necessary primary processes, the stoop-over labor in the orchards and vineyards. Take the sugar-beet production in this State. In traveling back and forth to my ranch in Kern City this season, I passed the great sugar-beet plantations near Tulare. There the white man came in with a plow and plowed the land, most of the time riding, and if it was hot, with an umbrella over his head. The beets were planted by a machine run by a white man, but when the thinning came and the hand-weeding came and that work had to be done, the white man disappeared from those plantations, because he would not perform, for any wage, the stoop-over work necessary. And so the Asiatics took possession of those fields; they thinned the beets, they hand-weeded them. Then the long-legged, long-backed white man, riding on a spring seat under an umbrella, cultivated with a plowing device; and when the harvest time came, involving stoop-over work, the Asiatics appeared and the beets were taken from the soil, and from that time on until they went into the mill. There white labor, employed at high wages, made them into sugar. From the mill the sugar went into transportation, again requiring white labor at high prices. The absolutely necessary processes having been performed by the Asiatics; then work and high wages were furnished to white men and women, work that was agreeable to them and that they willingly performed; but there was no competition between this white labor and the Asiatic labor in these necessary primary processes, because the white labor would not do it and the Asiatics would. This same principle of non-competitive Asiatic labor runs through the asparagus production on the islands in the deltas, to our celery production, largely to our bean production, and to other productions in which millions of dollars have been invested.

Twenty-five years ago I took what was then the popular view of Chinese labor in California. I committed many sins in taking that view and added my voice to those who were doing their best to corrupt and misinform public opinion on the question of that labor. Finally I concluded that it was my duty as a citizen to take up original investigation and find out for myself. I began that investigation, and at its conclusion my opinions were entirely changed, because the result of that investigation confirmed me in this opinion, that the presence of Chinese in California never inflicted any economic, industrial or social damage

on this State. On the other hand, it was continually of economic and industrial benefit to California. (Applause.)

I believe, as an observer of the situation, that the entire fruit industry of this State is founded, not upon the cheapness, but upon the fidelity and reliability of Chinese labor. You have got to have reliable labor to save your perishable property. Then, as the labor is non-competitive, does not compete with white labor, takes that which white labor rejects, why should not your rural land-owner and producer be permitted to have that kind of labor? (Applause.) Why should labor, in itself alien and under alien leadership, in our cities, be permitted to dictate to politicians of California what their policy shall be toward the rural producer? (Applause.) Has the rural producer no rights which Tveitmoe and Furuseth and McCarthy and Cornelius and Casey are bound to respect? You are not interfering with the labor situation in San Francisco or other large cities of this State. You are not dictating to employers who they shall have in their employ. You are not interfering with the laboring people of those large cities at all; but you, on your ranches, in your orchards and vineyards and fields, are building San Francisco; you are building every city in this State. You are adding every dollar of value that is added to its real estate; you are adding to its banking facilities. You are doing it all because if you withdraw the rural production of these vast fields and orchards and vineyards of California the cities of this State shrivel up like a scroll of thin paper in the fire. It is your production that sustains them. Every city built in this State purpled first in the vineyard and reddened in the orchard and was made golden in the fields of California before it rose as a city. Then why should you be dictated to, as you stand as the foundation of the industries and the business and the prosperity of this State? Why should you be dictated to by the people who live in these cities which your enterprise has created? Why should you not stand up independently and say, "We require, in the primary processes of our production, which lie at the foundation of California's prosperity, this form of labor, and, by the Eternal, that form of labor we will have!" (Great applause.)

Now, you have seen the result of the Chinese exclusion law. Economic law will have its way. It moves as resistlessly as a glacier. Following the exclusion of the Chinese and the rapid diminution in the number of that labor, there has been introduced here to take its place every form of labor that is less desirable, and in some instances enormously less desirable than the Chinese labor. (Applause.) You are getting southeastern Europeans here. You know what their habits are. But the theorist rises up and says we should permit only that immigration into the United States which we can assimilate. May God in his infinite mercy look down in all kindness on my descendants who

have committed to them the task of assimilating the southeastern European population that is coming in! (Laughter and great applause.) We have got to assimilate, raise them up; and these theorists never reflect that in the process of assimilation it is not the immigrants who are raised up, but American blood that is pulled down. In the process of assimilating this labor what has occurred? In the first place, the youth of the United States has deteriorated. In the last thirty years the age of men at the date of their first conviction for crime in this country has fallen from nearly 30 years down to less than 21. We have created in all of our large cities a juvenile court, especially charged with jurisdiction to take care of juvenile criminals and offenders. As a result of this process of assimilation and the degradation of our own blood in that process we are building in every State north of the Mason and Dixon line what we call reform schools for the same penalizing of incorrigible American youth. Pick up your morning newspaper in San Francisco; read the list of Americans committed to the prisons for any transgressions, and you will see that in seven cases out of ten the transgressors are under twenty-one years of age. In this process of assimilating and opening our labor field to this debased southern and southeastern European immigration we are destroying the future of the republic. An apprenticeship denied in order to leave all the work to the undesirable immigrant! Talk about Chinese competition! What have you to say to the organizations in this country which absolutely deny to an American-born boy the right to an apprenticeship and to a trade? That isn't monopoly at all. (Applause.) It is the problem in all our large cities. And so we go on debasing and degrading our young blood, criminalizing our own youth and condemning them to live in the vice of idleness, in order that we may assimilate an immigration that, in respect to law and order, industry and fidelity, is as much below the Chinaman as the monkey is below the Chinaman.

But we go on saying something because somebody else has said it. If the rural industries of California, the foundation of all prosperity, require this Asiatic non-competitive labor—a labor and form of immigration that we don't have to assimilate—we are not committing that hard task to our sons and daughters, to our grandsons and granddaughters, and our descendants. It is labor that is here to do our work for our wages, to behave itself, as far as the white people are concerned, in an orderly and law-abiding manner—its disorders being amongst its own members—a most desirable form of labor.

But they say there is a race question. Mr. Furuseth of San Francisco, head of the water-front federation, has discovered that there is a great race antagonism. I was reading the latest work on ethnology, Professor Tyler, and I find that the Russian Finns are pure Mongols;

and Furuseth is a Russian Finn; therefore, he is in blood a Mongol, and he is standing up telling us about race antagonisms!

The people of the Southern States and the East have been told that it is race antagonism; that it is the precise analogy of the negro problem in the South. Now, what is the original negro problem? The race problem relating to the negro is based in the fact that he belongs to a race which in all ages and times and in many nations has thrived in a condition of chattel slavery, and no race that accepts and thrives in a condition of chattel slavery has ever commanded the full measure of respect of other nations.

How is it with the Asiatics? When the bill for the admission of California was before the Congress of the United States, as one of the seven measures in Mr. Clay's omnibus bill, objection was made to it by Jefferson Davis and the Southern Senators because it proposed to admit California as a free State, although part of the territory lay south of the line $36^{\circ} 30'$, which, under the Missouri compromise, was to be slave and the territory north free. Mr. Webster, in discussing that, turned to the Southern Senators and said: "Your objection to the admission of this territory is not a valid objection. Slavery, like all other economic conditions, is the issue of certain physical causes. In its physical features, in its climate, in the plan of its mountain ranges and valleys and river systems, California is Asiatic. It partakes of the physical features and characteristics of Asia. Having the same physical features as Asia, it will be subject to the same economic and natural law, and I call you gentlemen of the South to witness that chattel slavery has never been known in Asia and no Asiatic race has ever submitted to it."

That told the story. Webster was a wise man, a man who knew the laws of Nature and who could apply them and trace their influence in the economic laws that govern and control the interests of a people. So these Asiatic races have never submitted to chattel slavery. They are not under the ban and bar sinister that is on the negro, because that race has submitted to and has thrived in chattel slavery, and that is the reason and cause of the race problem related to the negro in this country and everywhere else, and that does not apply to the Asiatic. They are not slave born. They do not submit to ownership; they do not submit to chattel slavery. They have their civilization, and there is no such race problem between us and the Asiatics as exists in the South between the Anglo-Saxon and the negro. We know them for the fidelity with which they perform their labor; we know them for their usefulness; and as far as we know them through their disorders, those disorders are amongst themselves and not amongst us.

You know the situation in California as well as I know it. You know that the great fruit-producing industry of this State and the

asparagus and celery and other large industries of production that bring millions of dollars into California and into your pockets and into the pockets of the people, money that furnishes work and wages for white people, work that they perform and wages which they dictate themselves—all that depends upon the prosperity of rural production in this State, and rural production in this State depends upon labor that you can rely upon, that will keep its word and do its work, and we know of no other form of labor than that which served this State so well—the laborious, patient, orderly, faithful Chinese.

Now, we have introduced an Asiatic problem here. It is a singular thing to study that the people have been taught to hate the Chinaman on account of his virtues, and they are being taught to hate the Japanese because of his vices. He has our vice of ambition, wants to get on and do for himself, and just in proportion as the volume of Chinese labor in California has declined and the field has been left to the Japanese, the Japanese has shown his unpleasant peculiarities; but the moment that you restore the balance, lift this infamous Exclusion Act which we have enacted against the Chinese and let the Chinese come—in proper numbers—the moment that the balance is restored, that the equilibrium is returned, then you will see the Japanese betraying less of the vices of the white man, because he will have competition in the field. (Applause.)

I say nothing against the Japanese. They show qualities that have been inured in them for ages, because they come of a race and a nation where the soldier has been at the top for ages and the business man at the bottom; the business man a pariah, the soldier a hero; and the Japanese government, realizing that to take its stand with other nations it must have commercial honesty, has begun inculcating in her public schools, from the primary grades to the university, the necessity of recognizing the principles of commercial honor. Japan has learned that to achieve a commercial career she must observe the law of nations, and she has begun the reform of ages of misapplication of principles to her people.

But we can't dismiss this. The crying need, the burning issue in California is, Are the rural producers of this State to be permitted to have that form and kind of labor upon which their prosperity and the welfare of the State depend? You know there are a few Chinese left. The man who gets a Chinese gang on his place feels that he has secured a prize in the lottery of fortune. Last night I was talking with a gentleman who is an owner on the delta, and he said, "I have had the greatest luck on earth. I have succeeded in filling four of my five tracts on the delta with Chinese, and I am perfectly content, because I know the work is going to be done whether I am there or not." But they are disappearing. Every means have been used. When laborers

have gone back to China, entitled under the laws to return, and have come back, they have been turned away and deported, under one pretext and another, because the men in charge of this are subservient to the politicians and the politicians are subservient to the great labor organizations of California, and there you are. (Applause.)

Now, as to the fact of the need of this labor and the loss that is coming upon the State unless we are permitted to have that labor, your enemies themselves admit it. One of the metropolitan newspapers, so called in San Francisco, said two years ago that it was better for every pound of fruit in California to rot on the ground than to have Chinese here to pick it. One of your members of Congress, living in a fruit region, said it was better that the prunes should rot on the ground than to have Chinese here to pick them, and if the rural people in his district had had a candidate to vote for that would have expressed their opposition to him he would have been left at home; but unfortunately, as parties were lined, they had no choice and they satisfied themselves by cutting down his vote, by refusing to support him. The rural people of California should believe that this is a burning issue; that it is a question that goes to their prosperity and the prosperity of the State, for there is but one way out and that is to organize.

When the Secretary of Commerce and Labor was out here I had a committee of some thirty or forty gentlemen from the rural districts of California and two from Idaho and Utah wait upon him and tell him the needs of labor, and he was surprised. He said he thought the anti-Chinese association in San Francisco was uttering the whole voice of California, that organization led by Tveitmoe and Furuseth and McCarthy and Casey—Tveitmoe, who served his term in the Stillwater penitentiary in Minnesota and came to California to dictate to you what kind of labor you should employ. He said, "I thought that man was uttering the voice of California." He said, "Now, let me give you some advice. Make your voices heard, sign memorials, send them to me, send them to Congress, send them to your members, and let it be known that there is not this unanimous sentiment against Chinese labor in California that we have been told exists. That is the only thing for you to do."

Now, if this labor has never inflicted economic damage on California nor industrial damage on California, if its performance has always been beneficial and profitable to the people of this State, why should we on this coast be denied the right to draw upon that labor as the people upon the Atlantic coast draw upon the labor of southern and southeastern Europe? Aren't you equal? You pay your Federal taxes. Your heart swells in patriotism for the flag. You love and support the institutions of your country. You face Asia. Asia is to this coast what Europe is to our Atlantic seaboard. We need commerce with Asia.

Can we have commerce and expand our trade when we treat their people as unequal and degraded and refuse to permit them to come to us? No, you can not have it.

Now, in another respect. The magazine writers are dealing with the question of rural life, wondering why it is that the people are abandoning the land and going to the cities. There are several reasons for that, and California has one reason, and that reason is the practical impossibility of getting domestic help upon the ranches of California to lift the burdens off the wife and daughters of the household.

We were entertained by a club organization last night. I have visited those clubs all over this State. I have addressed the meeting of their State federation. I have talked with keen-eyed and lovely natured women in every district in California on this subject, and there goes up from them all the one complaint of the impossibility of getting domestic help to go into the country and lift from themselves and their daughters the burdens. Now, you know that if we are permitted to receive the kind of labor that is needful to our wants, that question of domestic help is solved, because the Chinese when trained make the very best of house servants. I have had experience in that. I, twenty-five years ago, could get a woman. I paid her good wages and she left my family and went away and married; and it went on until my daily task, almost, when I went home was to go into the room occupied by the help and drag out some woman who had been sent there by an employment agency and who was lying in her room drunk, and I would dispose of her only to get another one. And then I got a Chinaman and peace settled over my house, a peace that passeth understanding (Laughter), and no money could take Jim away from my family.

Now, I want to see the ranchers' wives and daughters in this State permitted to take and train that reliable and efficient household help. I want to see the burden lifted off of the women of California. They are doing more than their share. When that is done one reason for the flowing of population from the country to the city will have ceased. Every rancher's wife knows the truth of what I say. It exists all over this State. Why, ranch owners in the San Joaquin Valley tell me that they actually feel ashamed almost to go into their houses and sit down to the table and enjoy the food and the shelter, because they know the burden that it places upon their wives and their daughters, a burden that they feel to be unjust, but which, under present circumstances, they are absolutely powerless to lift because they can not get help. Why should not the women of this State, living in rural life, be permitted emancipation from this drudgery? Mr. Tveitmoe does not send you any household help; Mr. Furuseth does not; Mr. Casey does not. It is just like when the Panama canal had to be dug and Mr.

Gompers and his Federation of Labor passed a resolution informing the Congress of the United States that, in the opinion of Mr. Gompers, who is a Russian Jew, and who fled to this country from oppression in his own country, the Panama canal should never be dug except by American, white, union labor; but he didn't try to send any down there. For my part I was willing to see the entire bunch exported and put to work. (Great applause.) But he didn't supply it.

When your harvest season comes on and your fruit is ripening, and it is perishable property and it may be ruin or profit for you—the saving of that crop—and you go down to Mr. Furuseth and Mr. Casey and the rest of them, do they send you labor to harvest your crop? No, they do not and they won't; and if they sent it it would get drunk on its first day's wages and that would be the last you would see of it. Then why should rural California be under the domination of these men? Why should you not have your rights? Why should you not have the same privilege to draw upon the nearest and most reliable market for labor, as the Atlantic seaboard draws upon its nearest available market?

Another theory has appeared to the effect that when the Panama canal is dug then we will get millions of these southern and south-eastern Europeans flooded through the canal, and that will solve the labor problem. You have got them here now. Have they solved any problem? They solved my problem of how to get my grape crop gathered in Placer County, because a gang of Greeks working on the railroad stripped the vineyard in two nights. They solved that problem for me. (Laughter.) Just below them was a gang of Chinese working on the same railroad, minding their own business, and every peach and pear in the neighborhood was absolutely safe from depredation. You are to wait, then, until the Panama canal is dug? If that is to be the case some of you upon whose heads there rests the frost that never melts, like it does upon mine, will have gone to the reward of your labors and a release of your burdens long before the problem is solved. But when you get them here through the Panama canal or any other canal you know just as well as I do that you can not depend upon that form of labor to do the work that must be done in these primary processes of rural production in California. Why not unite, organize, let the country know your wish, express your will? Let the politicians who represent you in Congress and elsewhere know that you have some rights for which you demand respect. Let them know that you desire to inflict no harm upon California; that instead of degrading American blood you propose to keep it pure, as it is, because you don't want to bring here a horde of labor that has to be assimilated. You want a form of labor that minds its own business, takes care of itself, obeys the laws of the country as far as they relate to their relations with the

people of the country—the most peaceful, the most useful, the most faithful labor that California ever had. Why not do that?

It is proper for me to say that I have no direct, personal interest in this question at all. I own three ranches. My production is such that I can not employ Asiatic labor, because it is mixed farming and the handling of live stock. Except for domestic servants in my house I have no need to employ Asiatic labor, because it is not adapted to the industries in which I am interested. And how is it with the white labor which I have to employ? On my ranch in Kern County I pay a farm hand \$40 a month. He has a good room to sleep in and as good a bed as my son, who is superintendent of the property. He eats at the same table at which my son eats and at which I eat when I am there. This is the twelfth month in the year 1907, and I have there now the twelfth ranch hand I have had this year. He works a month, takes his \$40, goes to town, throws it down his throat, and that is the last of him. You ask the ranchers in the San Joaquin Valley and they will tell you the same story. The crying need on those ranches where mixed farming is practiced is for the white labor that will come there and do labor that it can perform, that has not these burdens that attach to the primary processes of labor. They cry for white labor and can not get it, and when we who are practicing mixed farming, who offer steady employment at high wages the year around, and good food—when we can not get white labor to do our work, in the name of God where are you going to get labor to do yours? In Tulare County the alfalfa went back into the ground last spring because white men could not be hired for the harvest. All over the San Joaquin Valley crops were lost and wasted upon these ranches where mixed farming was practiced. When white labor in California won't go willingly for high wages and good treatment and do the work that is attached to it, what are you going to do with those primary processes of labor?

This labor situation is a burning issue, I tell you, ladies and gentlemen, in California, and if we are to maintain our progress, if our cities are to be built up out of the profits that are wrought from the land, then this problem must be solved by the only possible solution, giving us access to that labor which is nearest to us, the best adapted to the uses to which we want to put it. And let us not go on saying something because Denis Kearney said it, but let us look into the facts for ourselves.

As I told you, I am absolutely disinterested personally, but I know the crying need of my neighbors. I go among them; I think my face and voice are known in nearly every rural community in California, and I am determined that there shall be one public man in California who will lift his voice in behalf of the rights of the rural producer (Great applause), who is trying to mind his own business and not dic-

tate to anybody in the cities of the State as to whom he shall employ. You want simply to be permitted to attend to your own business in your own way, make your own profit and build up the State out of your own prosperity.

Now, I have written and distributed quite generally over California a memorial to the Congress of the United States which condenses all that I have said. I am going to leave some copies here; you may take them; you may attach signatures to copies; you may have them signed and send them to me, and I will send them to the President and to the Congress of the United States. This is the memorial:

To the Congress of the United States, Washington, D. C.:

Your memorialists, land-owners, farmers and producers of California and other Western States, beg respectfully to request the earnest attention of your honorable body and of the Department of Commerce and Labor, to the following statement of our needs and of the economic issues involved in the supply of Asiatic labor in the rural industries which we represent.

Long trial and earnest effort have proved the impossibility of inducing reliable white labor to engage in the primary processes of production in the orchard, vineyard, asparagus, sugar-beet, onion, celery, and other great industries in which tens of millions of dollars are invested. In California especially much of this primary labor has to be under fixed climatic conditions which the Asiatics alone will willingly endure. It is labor performed under a high temperature, in a stooping or squat position, which white men will not do. With your memorialists it is not a question of cheap labor, but of reliable labor that will save these valuable crops of perishable property, worth millions in the market. The Chinese Exclusion Act has depleted Chinese labor, and extension of the exclusion policy to the Japanese leaves these imperiled industries exposed to enormous losses, and threatened with ultimate extinction. The opposition to Asiatic labor is found in the cities, due largely to the efforts of agitators who are themselves of alien blood. They and the class they influence will not do the work done by the Asiatics, at any wage. They are repelled by the physical conditions and limitations. For many years every inducement has been offered to them to enter into this service, and they decline to do so. It is evident, therefore, that the labor which is willing to enter the service which they refuse, does not compete with them. On the other hand, such Asiatic labor, by performing the primary processes which it alone is willing to undertake, by passing the product into commerce, furnishes work at high wages to many forms of white labor, under conditions agreeable to it and possible of performance.

Your memorialists are aware that heretofore the voices uttered and the objections urged from the large cities have been taken as the sentiment of the whole people. We find now that our silence has permitted the achievement of an exclusion policy in nowise beneficial to those who have urged it, and at variance with correct economic principles. We get no benefit from the European immigration which crowds the Atlantic seaboard. If that immigration reaches these far states, it is under the same limitations as the white labor that is already here and shuns the work in the primary processes of the industries we represent. Our only resource is Asiatic labor. We affirm that there is absolutely no evidence that these states ever suffered industrial or economic injury from the presence of the Chinese here, prior to the exclusion law.

We present the foregoing reasons for our demand that the Chinese exclusion law be modified and that a fixed and liberal number of Chinese and an equal number of Japanese be permitted admission, annually, under the same restrictions as to sanitary and other proper conditions as are put upon immigrants from Europe. We reject the theory of assimilation, holding that non-assimilating labor to engage

in this non-competitive work relieves us of the strain upon our racial and national standards which threatens their subversion in the task of assimilating the millions of European immigrants.

Your memorialists urge the immediate attention of the Government to our needs.

I will leave these here and call your attention to them, and I wish that they would be numerously signed, sent to me in San Francisco and I will forward them to Congress. If anything is to be done on this question in California it is time we move. It is true, the people say the national election is coming and nothing will be done now. Very good. You can lift your voices now, and when you have publicly lifted your voices you will find yourselves more able to lift your voices and declare this question. Step out and relieve yourselves of that bondage of fear which the State has been under to the adverse organizations in the great cities of the State and declare what your needs are and let your representatives know what they are. There is always a time to start reform, and having submitted to wrong and injustice and a policy adverse to your interests, now is the time to stand up and speak and to keep speaking until the remedy comes. I thank you. (Great applause.)

MR. KING. Mr. Chairman, I thoroughly indorse what Mr. Irish has presented to us at this time. I am but a newcomer in California, and I want to say now, had I as a business man investigated the labor conditions in California, I never in the world would have invested a dollar here. And I want to say more than that. If no protest goes out from this rural community you will put a stop to the future immigration of desirable people who will bring money into California, as so many thousands have been doing in the past. You have a manifest duty before you right now, and if you don't wake up to this occasion you will find that California is not going to take the lead in prosperity which she ought to. And I want to go further, and I believe we ought to do this for its influence upon the rural districts, that this Convention should, by resolution, indorse the memorial which it is proposed to send to Congress. It will give courage to the people to whom you send it and will do a vast amount of good in expediting this measure. I make a motion to the effect that this Convention do indorse the proposed memorial to Congress which is to be circulated.

The motion was duly seconded and carried, there being one opposing voice.

THE CHAIRMAN. We can hear Mr. Hecke's paper, and then it will be permissible to discuss the whole question after that.

THE PACIFIC COAST LABOR QUESTION FROM THE STANDPOINT OF A HORTICULTURIST.

BY G. H. HECKE, OF WOODLAND.

During the last decade the land-owners and agricultural producers of California, Oregon, and Washington have been confronted with a labor problem that has so far baffled all solution—the scarcity of efficient farm and orchard help at certain periods of the season.

The fruit, vegetable, sugar-beet, and hop areas have increased rapidly with the development of the country, without a corresponding increase of available help to harvest the perishable produce.

In these industries there are conditions that are peculiar to the Pacific Coast. There are certain periods of the season, comparatively short, during which there is an urgent demand for a large number of unskilled laborers to harvest and handle the varied crops. Unfortunately there are other periods of the year during which there is no employment on the farm or in the orchard and vineyard for most of these unskilled workmen.

Commencing with strawberries, cherries, asparagus, and hay in the spring, continuing through the summer and fall with apricots, peaches, hops, beans, wheat, barley, raisins, and prunes, and ending in the winter months with olives and oranges, it may be said that the harvest season goes on from one year's end to another without interruption, but the amount of help required varies with the season. It is this irregularity in the demand that makes the supply so uncertain and wholly inadequate, frequently resulting in disaster to crops and material loss to the producer.

For the preparation of the soil and the cultivation of crops efficient white labor is usually available, but the harvest season, which is necessarily a limited period, requires a vast amount more help, and in a great measure the agricultural and horticultural industries have been dependent upon migratory Oriental labor that has no fixed place of habitation, but is content to begin where crops first ripen and move from place to place as the seasons progress.

During the last four years there has been extraordinary railroad development. Unskilled labor can be utilized to good advantage in construction work, and the demand from railroad contractors for that class of labor has served to further accentuate the labor problem that constantly confronts those engaged in agriculture and kindred industries. Other new industrial enterprises have opened additional avenues for the employment of labor, and so great has been the increase in the demand for skilled wage-workers, that intelligent and reliable white labor is no longer content to engage in menial occupations, and there appears to be room for more of that class of laborers who are willing to

do that monotonous drudgery that is inseparable from an agricultural or horticultural life. The problem is, Where and how can we get them? It is not a question of wages. During the season that has just closed, it was impossible to get a sufficient number of reliable white men, *at any price*, to harvest the hay and cereal crops and to gather the products of the orchards and vineyards. And it was not always easy to get a sufficient number of Japanese at a time when the necessity for more labor was imperative. As for the Chinese, they have practically disappeared from the Pacific Coast and are no longer considered as factors in the labor situation.

Conditions have been gradually growing worse from year to year. That this would be so was recognized by the twenty-seventh annual Fruit-Growers' Convention, held in San Francisco in December, 1902. The whole subject was exhaustively discussed at that time, and as a result a committee of fifteen was appointed to devise methods that would induce white immigration from the Eastern and Middle States sufficient to meet the demand in California. Hon. H. P. Stabler was chairman of that committee, and he and his associates worked indefatigably. As a result of their efforts nearly one thousand agricultural laborers were persuaded to come to this State. The situation was temporarily relieved, but partial success only served to emphasize the fact that the relief was not adequate, and that if any further is to be obtained it may be necessary to look to another source.

These Eastern and Middle States farm laborers in most instances proved to be steady, industrious, and reliable men, but it would be unreasonable to expect them to be satisfied to carry their blankets in the wake of the harvesting as it moves from one district to another with the ripening crop. Experience and observation soon taught them that while this is a land of opportunity, and its possibilities can hardly be overestimated, to prosper they must have steady employment. They soon made the discovery that there are certain kinds of field work, which are necessary on account of the character and wide range of productions, which the white race will not endure with patience. Being intelligent, they naturally sought to better their condition. Having frugal habits, energy, and thrift they prospered and acquired the means, or established a reputation for honesty and industry that enabled them to buy or lease farms, orchards, or vineyards, and many of them are now operating such properties on their own account. So, the labor problem promises ever to be a vital question.

Before the enactment of the exclusion law there were enough Chinese in California to meet any exigency in the labor situation. They proved themselves well adapted to that particular form of labor to which so many white men object. They were patient, plodding, and uncomplaining in the performance of the most menial service. They were

content to live apart and board themselves. The bosses regulated the prices. These bosses furnished the number of men required, and when the harvest or other work was completed in one locality they were content to move to another. No Chinese laborer ever repudiated a contract made for him by his boss. Indeed, it was a rare occurrence for a Chinaman of high or low degree to violate a contract. As faithful and skilled cooks, they gave good satisfaction and relieved the farmer's wife of many a care and burden.

The Exclusion Act did not operate altogether as was expected. It not only put a stop to Chinese immigration, but resulted in Chinese emigration. They have either gone back to their native land or scattered among other states of the Union until their presence is hardly noticeable and their numbers have no appreciable effect on labor conditions. In their stead we have the Japanese, whose coming is little hampered by any restriction law or treaty provisions. Their numbers are constantly increasing and they are invading every avenue of industrial life. They are not as honest and reliable as the Chinese, but they are more aggressive. They are cunning—even tricky. They have no scruples about violating a contract or agreement when it is to their advantage to do so. They of all are far short of giving satisfaction as laborers in the service of Americans. This is partly due to racial pride and a self-consciousness of their own importance. They are great imitators and tireless in their efforts to acquire knowledge that will enable them to become contractors, or to acquire the control of land by either purchase or lease. They are not long content to work for others; their ambition is to do business on their own account. While they have no organized unions, as we know them, they are clannish and have such a complete understanding among themselves that they can act promptly and in unison in an emergency. The Japanese employer is not troubled with a labor famine. The American producer may suffer great losses in his crops for lack of labor, but the Japanese employer adjoining can always depend on the help of his countrymen.

One of their methods of squeezing the American producer is to contract to do certain work at a certain price, and then in the rush of the harvest season, at the most critical time, when the perishable crops need immediate attention and the producer is completely at the mercy of his employés, demand an advance in the contract price, with the alternative of facing a strike. This is certain to occur as often in the season as the Japanese is certain that he is in a position to enforce his demands. That is not all. Orchardists and vineyardists have often been influenced to lease their property to Japanese by the threat that they will be boycotted and suffer the loss of their crops for lack of labor to harvest them. It is comparatively easy, where the Japanese dominate, for them to drive their American competitors out of the commu-

nity. In Vaca Valley and in the tokay and strawberry districts around Florin, not only do they lease orchards, vineyards, and gardens, but they are gradually acquiring ownership. The Japanese do not like to work by the day, but insist on contract work, and as a rule the work is slighted and there is continual bickering and trouble about the remuneration.

In the harvest season the Japanese earn as high as \$2.50 to \$5 in a day in the different districts, commencing with work in the strawberry gardens, and ending with work in the olive and orange groves. This shows absolutely that their labor can not be classed as cheap labor, and on this account very little objection could be urged against them if it were not for their tricky dealings, deplorable commercial unreliability, and their lack of honest business methods. Under these conditions the American employer can not help but contrast his business dealings with the Japanese with those that he had with his Chinese help.

Chinese are barred by the exclusion laws, but the plentiful opportunity for employment at remunerative wages and the mild climate of the Pacific Slope are inducing another Oriental race, the Hindus, to immigrate in ever-increasing numbers, and at the present moment it looks as if they will prove likely to be the most serious menace that has threatened American labor, or disturbed the relations between employer and employé. They are introducing among us a most pernicious caste system. The Hindu has fixed, irrevocable ideas and customs which we do not understand and will not tolerate. They are coming by the hundreds at the present time, and they are likely to increase to thousands in the future.

Both the Hindu and Japanese immigrants are likely to remain here permanently. Their presence is certain to incite race prejudice and may often incite race war, and will be a constant menace to the peace of the country. It is certain that neither of them can ever satisfactorily supply the demand of the American employer of agricultural labor. The supply of available white labor is and always will be insufficient, for the reasons above stated. Hindus and Japs are both unsatisfactory and undesirable. What, then, is the Pacific Coast producer to do? It seems that he must either limit his product to what he and the few white men he can afford to employ the year round can harvest, or else look to some source not now available for the extra labor that is required at certain periods of the season.

The solution is not an easy one. The country can not prosper, old industries can not grow, and new ones can not develop unless confidence and satisfactory relations are maintained between employer and employé. In our anxiety to maintain these relations and protect American white labor from the encroachments of the aliens of other countries, with which we can not compete, it is difficult to convince the

public that we may have gone a step too far in excluding altogether those who are adapted to do certain work in which there can be no competition, because white men will not do it.

We exclude the Chinese absolutely, but are opening our doors to the Japanese and the Hindus, although both classes are more objectionable than the Chinese. Such discrimination is unwise and unfair to both ourselves and the Chinese. If a reasonable restriction is deemed advisable it should apply with more force to the Japanese and Hindus than to Chinese, for the latter is the least objectionable of the three, and there are conditions under which we can utilize the labor of a limited number of Chinese laborers without bringing them into competition with white labor, while the Japanese are certain to be a constant menace to both employer and employé.

Suppose that the exclusion law was so modified that a limited number of Chinese were allowed to come to the Pacific Coast? Is it not probable, then, that we would have a class of reliable laborers who would perform certain field labor which men of our own race will not do on account of the physical and climatic conditions that prevail, and which can not be eliminated? It is no experiment. We already know that Chinamen are patient and industrious; that they are content to move from place to place where their labor is needed, and that, next to the sober, reliable white men, they are the most satisfactory laborers in the horticultural and agricultural industries.

Of course to remove opposition to the modification of the restriction law as suggested, it will be necessary to convince the people, and especially the laboring classes, that to continue under present conditions means limitation of the operations of the American producer, to put a check upon progress and development, and to limit the field open to American genius and enterprise. They must also be convinced that to employ Chinese in menial service which no other race can or will perform *satisfactorily* can not possibly bring them into competition with white labor.

In any event, the solution of this question can only be reached by honest, fair-minded, patient investigation, uninfluenced by political expediency or cheap demagoguery. The situation is this: We must have more available labor at certain seasons of the year, otherwise land-owners will be forced to abandon crops that require coöperative hands and return to primitive methods in which the labor is not such an essential factor. No one will dispute that the tendency among men is to accomplish their purpose with as little effort as possible and with the least possible discomfort. It has been convincingly demonstrated that, owing to existing conditions which it seems can not be changed, at certain times of the year certain kinds of work are necessary for which white labor is not available.

It is not a theory, but a condition that confronts us. It can not be evaded. We can not temporize with it. We must meet it fairly and honestly and with an earnest desire to do that which will be for the best interest of all concerned and will best encourage the development of the resources of the Pacific Coast and the expansion of our commercial and industrial activities.

DISCUSSION OF LABOR QUESTION.

MR. MILLS. If you have a few moments and you will hear me, I would like to discuss one feature of this question. I am an employer of labor—of white labor and of Oriental labor. The statement was made here, and it is all too true, that the white laborer when he receives his pay on Saturday night goes and dumps it into the saloon. What is the cause? Now, I don't want to tread on your toes, but I think I can tell you some of the causes. Recently I was at a large grain ranch where horses were cared for better than the men. Where was there a place for the man to go but in the loft over the horses' mangers, under the shake roof that rattled in every breeze that blew from the north or the south or the east or the west? There was not a stove to dry his wet garments before he went to bed on a stormy night when he came in from the field where he was working for the inhuman man who paid him his wages. I tell you, gentlemen, we have, as employers of labor, a duty as well as the laborers, and that is to house them as Colonel Irish says he houses his. How many ranchers house their men as he says he does? How many ranchers are there who will sit down with their men and give them the inspiration they need? I myself have been a laborer. I myself have been offered the side of a rail fence and a five-gallon coal-oil can to cook my meals on, laboring in California. We must provide comfortable quarters, lectures for the men, music for the men, if you will, if you expect to get, for the money that you pay, the labor that you need. You must make it possible for the man to be comfortable in the quarters that you give him, so that he will not have to go to the saloon and dump his money over the counter and the damnable stuff down his throat. You want to make it impossible for him to find so many saloons, to give him comfort, warmth, entertainment, music, and everything which the social being needs. Give comfort, give encouragement and inspiration, and the men who are laboring for you, the white men, will remember, and I venture the assertion that half of your trouble will have ended. We are not fulfilling the law of Christ to-day in the treatment of the white labor or the Japanese or the Chinese or the southeastern European, and I say, with Colonel Irish, God save us from southeastern Europe and give us any other labor than that. But let us first act right with the white labor that we have, our own brothers from the western prairies, our own brothers from the limits of

the Northern Circle. I plead with you—it pays in money, it pays in morals, it pays dividends of righteousness to more righteously treat your men who come to your door to harvest your crops, and not let them lie out along the fence or over the mangers of the horses or in the rickety old barn. You will get help that is worth having if you will treat them right. I know it; I have tried it. I have hundreds of men and I haven't a drunkard or a gambler among them, nor in traveling twenty miles over the property that I superintend will you find one single man who is unworthy of your friendship, nor will you hear an oath in a week, because the conditions which surround them are those that we human beings need. You and I would be in the saloon—I would; I would go to the saloon if I had no other place than the places that many of our laboring men have to inhabit on our ranches. I need some social features in my life. Give more of your money, more of your heart, more of your soul to the settlement of this white labor question, and you will settle it; then get after the politician. John P. Irish said the truest thing—that we are not enforcing our rights at the primary. You men, who are American citizens, go to the primary and send to the convention Americans worthy the name, and you will have in this debasing legislature at Sacramento better men to pass your laws. The whole question resolves itself into the fact that you have been forfeiting your rights as citizens; and God help you more righteously to remember the great trust that is upon you as American citizens, and you will solve the labor question, and many others, too. (Applause.)

THE CHAIRMAN. We have now "The College and the People," by Prof. Leroy Anderson, now of the State Farm at Davis.

PROFESSOR ANDERSON. I have no doubt that this calm and quiet paper was introduced here at this time to give you a chance for good digestion after so exciting a session as you have had in the last hour or so, and so I will attempt to perform my duty in as quiet and peaceable a way as possible. The subject may not mean so much to you as a different statement of it, that is, the bringing of our agricultural education somewhat nearer to the agricultural population.

THE COLLEGE AND THE PEOPLE.

By PROF. LEROY ANDERSON, DIRECTOR OF CALIFORNIA POLYTECHNIC SCHOOL,
SAN LUIS OBISPO.

The time has passed when there is any serious question as to the usefulness of an education for agriculture. All thinking men—all progressive farmers, horticulturists, dairymen, and stockmen—believe in the agricultural college and the experiment station, because each has done something, or can do something, to aid his particular calling. This unanimity of opinion did not prevail a generation ago, or when

you and I were attending school. The agricultural colleges have had a hard fight. They have fought consistently, using every honorable means to make the people see their need of it, and have proven that they can fulfill the need. The college, however, has not fought alone. It has had staunch friends among the rank and file of intelligent farmers and merchants, and in many cases has been led by them into broader fields of activity and into a larger usefulness. In this matter the instruction in agriculture has not differed materially from other lines of industrial training; for in many instances an awakened public has led teachers and school boards into the establishment of schools for manual training in our cities; and in fact, when public funds seemed not available, private fortunes have been used to found such schools. The beginning of secondary industrial schools in this country is credited to such high-minded and far-sighted generous souls.

If the time has passed when the usefulness of an education *for* agriculture is to be questioned, there is likewise no more doubt regarding the value of an education *by* agriculture. The innumerable divisions and ramifications of farm life and farm processes make it incumbent upon the farmer to know a great many facts and principles if he is to farm successfully. The soil, the trees, and the vines, with their culture, their insects, and their diseases; the animals of many breeds and individualities, with their care and breeding and feeding, all demand that the farmer have a training, an education *for* his work. It is a matter of congratulation that educators, even those who had in former years depended upon mathematics and the classics for adequate mental training, now believe that the same study and thought applied to agricultural sciences and practice will result in an equally well-rounded mental development. The agricultural population and the general public desire that, for the common weal of the nation, those engaged in the chief productive industry should be as well educated as those in any other occupation. Happy are we, therefore, to be assured that the boy who spends his days in the field and shop and laboratory, in conjunction with the lecture room, may come out of school or college as large in his mental calibre, as strong in his moral fibre, and as broad in his culture, as the boy who has spent his days in the libraries and in searching ancient lore. Let us farmers, then, be proud of our calling and hold our heads high, because ours is an occupation which needs a wide training, and in securing which we may find that education which makes men better know how to live.

These comments may be said to apply to conditions in all the states and to all the agricultural colleges. Let us come home to our own conditions and our own State problems in education. Every one whom I have the honor of addressing has achieved some success in his chosen line of agriculture, which in this instance is growing fruits or vines.

Some of you have had general college training, some an agricultural college training, while probably the majority have had neither. The general college training has helped you to solve your problems because of the strengthening of mental processes. The agricultural college has done this, too, and has further given definite instructions as to procedure under certain conditions and has been more helpful accordingly.

For the information which the college gives boiled down, running over, in real scriptural measure, the majority of farmers have sought in the agricultural press, experiment station bulletins, books, farmers' institutes, reading courses, conventions, and farmers' clubs. The large portion of this fund of knowledge has come from the experiment stations of our own and other states, or from field and laboratory investigations carried on by other public bodies such as the State Commission of Horticulture. The experiment stations have made good teaching in the agricultural colleges possible and have given them a greater impetus and a greater means for usefulness than could or has come from any other source. The means for instruction above mentioned are all good and all are recognized throughout the land as imperative in awakening a livelier interest in our occupation and in creating a desire for further and more scientific knowledge, as well as satisfying to a degree this desire.

If you have not had the opportunity to attend an agricultural school, but have been dependent for the wide training needed upon the means of home study, do you wish your sons and daughters to enter your occupation with the same tools, or will you have them better equipped through a regular course of study especially planned for their needs? I am confident that every father and mother says, "I want my children to have a better education than I had." I remember well my father's repeated statement to this effect and how hard he worked to accomplish the end. You want your sons who are to be farmers to study the sciences and the practices relating to the farm, to the end that they may become more interested therein and be able to compel the soil to yield ever-increasing returns. You want your daughters to study the sciences and approved practices relating to the home and thereby become better home-makers.

I am not so sure, however, that you all want your sons to go up to the agricultural college. On the contrary, I imagine you have an idea that the college should come closer to you with its fund of knowledge and store of wisdom. It may not be that you have evolved a scheme satisfactory to yourselves as to just how this closer meeting is to take place, but there is the strong desire which can not be evaded. Is not the trouble here? The college presupposes a high school course of four years, the latter giving no attention to agricultural subjects, and following eight years of grammar school in which agriculture is not mentioned. It is not apparent to you why the boy who expects to spend his life

upon the farm should go through so much preliminary training in order to study agriculture in college, and you reason that it should be possible to receive instruction in agriculture in the lower schools. I agree with you most heartily, and will say further that the vast majority of farmers who, in the future, shall have had an opportunity to study their life work in the schools and colleges will have done so in institutions of high school grade; and if by the establishment of such schools we shall not have been able to lead more pupils from the grammar to the secondary schools, the majority even will have received their agricultural instruction in the grammar schools. Assistant Secretary of Agriculture, W. M. Hays, said in an address last January before the Pennsylvania State Board of Agriculture: "The assumption is now proved erroneous that the farmer should be afforded as long a course of college study as persons preparing for the technical professions."

When the college of agriculture was established by the Morrill Act of 1862 it stood as near to the people as it was possible to stand. Its course of study could not have been of so high a grade as now, because there was not the recognized standard of preparatory schools as now. Students could enter with almost any kind of preparation—at least, no more than we now ask for the high school. With the growth of the college and the university, of which it is an integral part, came more vigorous standards. The college of agriculture could not, without humiliation and disgrace, admit students to regular university standing without demanding an equivalent preparation. Nor could its graduate receive the university diploma except his four-year course had given him an equal training with the graduate in mechanics, chemistry, or letters. If he wanted to teach, or enter experiment station work or commercial employ, the vigorous college training was none too high for him.

Thus has the college of agriculture seemingly grown away from the farmer, but in reality it has not. There has entered between the common school and the college, the high school as an intermediate institution whose chief object is to prepare for college and the university. Is not this the school the farmer has allowed to get away from him? The college of agriculture has been following the line that was necessary to preserve its dignity and greatest usefulness, as will be shown in later years, because it has the entire State to serve for both instruction and experimentation. Some of us have been stewing about the college while we have been blind to our local schools, and have let them get as far away from our agriculture as the two poles are from each other. You need to lasso that school in your community and tie it to your agriculture. The larger cities in our State found their high schools getting away from the common people, but instead of lassoing them they started new ones and named them polytechnic high schools. Now, the boy can learn carpentry, iron work, electricity, etc., along with his language and

mathematics, and when he finishes can go to college or is prepared to enter a trade. You can not afford to build another high school in your country community, so make over the one you have into an agricultural teaching one, and see how quickly and how surely the college of agriculture will help you. This thought is entirely in harmony with the prediction made a few moments ago, that the great majority of farmers who have had a school training in agriculture will have secured it in an institution of lower grade than the college.

But I am laying out a pretty hard problem for you—harder than present conditions make feasible. The college of agriculture proposes to give you an easier method to educate your children in agriculture before they reach the college than by making it incumbent upon you to reform your local schools, however desirable such an end may be.

By an appropriation of \$150,000, made by the Legislature of 1905, the University has been enabled to purchase over seven hundred acres of as good land as lies out of doors, and located centrally to this great valley at Davis. By an additional appropriation of \$132,000, made by the Legislature of 1907, the University will be able to complete necessary buildings, purchase equipment, and employ a teaching force to begin instruction in the fall of 1908. Here will be brought close to the agricultural population all that the college has learned and in as elementary, as instructive, and as interesting a manner as is possible. I understand that two main lines of instruction will be established: First, to supplement the means of home study which you now enjoy by short courses in the subjects in which you are most concerned; second, to establish a secondary school.

I have indicated the double responsibility of the University to give instruction to the adult who had not the opportunity of study at college or in agricultural school, and to the youth. This responsibility is not simply a present one, but will always exist; for no matter how many schools may be established there will ever be some who can not attend. Moreover, new investigations leading to new discoveries must continue to be disseminated by literature, institutes, conventions, and short courses at college. So you will be invited to come to Davis to the University farm for two, three, or four weeks to study, to exchange ideas with each other and the instructors, and to become enthused for a new hold on life and on your occupation. You are not asked for a longer period, for we believe you could not come—could not leave your business. Will you accept the invitation now and plan to meet the college half way in its endeavor to come closer to the people?

To the youth who has not become engrossed in his life work, but who is seeking a preparation therefor, a plan of greater attractiveness is being unfolded. When he has completed the grammar school and is about fifteen years old, or more, he is to be invited to spend two or

three or maybe four years at Davis, and to the nature-loving youth nothing can be more attractive. He will study of plants, trees, and vines, of horses, cattle, sheep, swine, and poultry, of the soil, its cultivation, irrigation, and improvement, of farm machinery, tools, and implements; he will learn to use forge, and carpentry tools, plan and build buildings; he will study the English language, mathematics, and government. Result: as well rounded a young man as ever graduated from the high school and fitted with the mental and mechanical equipment to become a good farmer, or to go on to college if he chooses to become a teacher or experimenter in agriculture. Will you accept the invitation for your sons, and send them when the doors are open for this grand opportunity for California's grand young men? You must meet the college half way in its efforts to supply the secondary training, or all the money spent in equipment and teachers goes for naught. I am confident that you will not be found wanting.

This secondary school of agriculture, as we are pleased to call it, is not new, even in California. One has been in operation four years at San Luis Obispo, and some of Sacramento Valley's good sons are in attendance. Assistant Secretary Hays says there are more than thirty of them in the United States, and he says two or three hundred are needed. The next move of the National Government to further education will undoubtedly be to establish such secondary schools throughout the nation—possibly one in each congressional district. So our college of agriculture is not treading on entirely new ground and is assured of success from the beginning, provided you send your sons.

As a concluding word, let me say again that the college is standing where it ought to stand as a part of our great University in a position of dignity and honor. I do not believe that you would like to have it lowered by taking a position subordinate to the other colleges or to agricultural colleges in other states. It will meet your needs, your fondest desires for more elementary and practical instruction, by its schools at Davis. The University is grateful to you and the Legislature for your confidence in making large appropriations, and it enters the new field of secondary schools with a determination to administer the funds to the best advantage of the farming people. When you have considered the plan thoughtfully, I am sure you will see that California is to have a scheme of agricultural instruction second to none in the land. But do not forget that your high school and the little roadside school should be teaching agriculture also. If the cities can have a manual-training system beginning in the grammar school and continuing through the polytechnic high to the University mechanics department, why can not we have agriculture running through the entire system—country school, agricultural high, and the University agricultural department? It is not too much to hope for, and some day we shall see it. Will you help?

DISCUSSION ON STATE FARM AT DAVIS.

THE CHAIRMAN. Discussion on this paper is now in order.

MR. MILLS. I would like to ask the gentleman what the qualifications are for entrance to the new school at Davis.

PROFESSOR ANDERSON. No definite plans have been made as yet. For the short course there will be no requirements whatever; anybody can enter; and that is especially for adults, men who are already in some branch of farming and want to learn more about what is being done in the experimental field. The secondary school work is usually carried on after the grammar school. For instance, at San Luis Obispo we admit students who have finished the grammar schools and are fifteen years of age. I have not taken up the work yet and I really ought not to say very much about it, but I think that is the coming thing in our agricultural instruction to-day. It has proven to be most successful in states where it is tried, and our four years' experience at San Luis Obispo shows that it is the proper thing to do.

MR. BERWICK. Mr. Anderson, some of us think it would be a better object lesson if that farm could be made self-sustaining or even profitable. It is so easy to run a farm with a great expenditure of money, but it is so hard to run a farm and make the money out of the farm. Could you make that farm self-sustaining?

PROFESSOR ANDERSON. How do you mean?

MR. BERWICK. It would be a better object lesson for a model farm to pay its own way out of the farm. Is it possible, do you think, in any way to do that?

PROFESSOR ANDERSON. No; it is not.

MR. BERWICK. And for what reason?

PROFESSOR ANDERSON. In asking that you are asking something which you do not ask of any other school. You have a carpenter shop to teach boys carpentry; you don't ask for that to be self-supporting. A machine shop; you don't ask for that to be self-supporting. Where a school is located at a farm the farm must be looked upon as the laboratory of the school, and, taken as a whole, can not be expected to be any more self-supporting than a laboratory in the machine shop. On the other hand, a field of oats, or a field of corn or rye, by themselves, providing there isn't too much done in the way of experimentation, will in themselves show a profit, or may show a loss. So we find on our farms that certain crops grown in the practical way will show results. But, taken as a whole, your farm can not be made self-supporting, and there is no college or school in the United States making it so, so far as I know. The dairy itself will show good returns, but the State will always have to make appropriations for the farm laboratory.

MR. BERWICK. I don't think the thing is quite analogous to a

laboratory and a school. You are teaching your young people to produce economically and with profit. I don't see why the State farm should not produce with profit as well as any individual farm. If you do things extravagantly on the farm you are giving a bad example to the young people who are with you, and I think they should learn from the start to pay as they go. Perhaps I am wrong, but that is how it appears to me—that it would be the best possible lesson to a young farmer to see how the State could make that thing pay. I have been myself a victim of theory through life, and I see no reason on earth why your farm should not more than pay its way. I can see full well in a school where the chemical laboratory pays nothing. But when a boy milks a cow or runs a plow or plants a tree or cuts alfalfa, he is a producer; he is making something of value from the start, and I think it would be the best object lesson possible to make that farm pay its way.

A MEMBER. I was at the Davis farm, and among the things that interested me a great deal was the fact that they are going to bring a bunch of earth from Kansas and plant on it some of that Kansas wheat, of which they import 110,000 tons to mix with our wheat. Now, to bring a carload of earth from Kansas and to find out something that might be worth millions of dollars to California, in itself never can be made a profitable proposition, yet it seems to me might be worth millions of dollars to us as wheat-growers of California, and many other things of that kind. It seems to me that it is impossible to consider that side of the question in an institution of learning. We might as well expect the young physician to make the college self-supporting and go to sawing people's legs off just for the experiment. I don't look on the agricultural farm as a place other than for preparing young men to make themselves better farmers, better business men, better legislators, and for securing an education that prepares them for future life, just as well as the colleges prepare for the ministry or the law or medicine, and I think that is the view that we will have to take of the farm at Davis—an expense to the State for experimental purposes, but in the end a great source of benefit and profit.

COLONEL IRISH. Mr. Berwick wants this, as a State industry, owned by the State, to pay. The State is running one productive industry now as an owner, the State Printing Office, and I don't think it is fair to lay the burden on the professors of this farm, that the State, in running its own printing office, might show a profit; one is industrial, the other is a training school. You might as well demand that the chemical laboratory in the University be self-supporting or show a profit; it is for teaching purposes, and the loss comes through imparting knowledge to the students.

MR. BERWICK. I can see very well that in so far as it is an experimental farm it can not pay, but I maintain the most essential

thing a farm of this sort can do is to teach the young people how to produce with a profit, and it seems to me the best way to teach them that is to do the actual thing right there on the State farm. If you are bringing soil from Kansas, if you are experimenting in expensive ways, of course the thing can not be done; but simply to run it as a model California farm I still maintain the farm should pay expenses, because if those who best know how can not run a farm so as to make a profit, how can their students do so?

MR. MILLS. Wouldn't it be better for the State to set aside a piece of ground as a model farm?

MR. BERWICK. I assumed this was a model farm. If I am wrong I beg pardon, but I regarded this to be the model farm of the State to show our young people how to farm with profit. It is not analogous to the chemical laboratory.

PROFESSOR WICKSON. Mr. Chairman, Ladies and Gentlemen: I appreciate the fact that there is not ample time for the full discussion of the important issue Mr. Berwick has raised. I want to quote something which Mr. Pillsbury just whispered to me, which is perhaps better than anything I can think of in a minute, and that is that the farm was intended to be made for the students and not the students for the farm; and I take it the significance of that is that the farm is to be used to teach the students to do something and not use the students in order that the farm may be profitable. Of course, there is something in that point. Now, there is another consideration that is near to it, and that is that a model farm has been a failure ever since the first one was thought of, and if that farm at Davisville is to be a model farm we should be the first to ask the State to take it back. We can not use it in that way. It is not possible to proceed along the line of successful operation by skillful men and have your students sitting around on the fence smoking cigarettes and watch you doing things. You have to teach those students to do things themselves. Now, that requires a teaching force, in the first place. The man who does a thing successfully can not always tell why he does it, nor is the mere observer able to take the lesson entirely by observation. He has to be told something about it. That brings in a teaching force. You can not make a farm of that sort profitable unless prices should be inordinately high, because a teaching force is no part of the expense of a commercial farm; it is a part, and an essential part, of the teaching.

Now, we will have to acknowledge at the very outset that we can not teach those boys how to farm successfully by having them stand around and see other people do things. We have got to show them how to do things themselves, and they are going to make a terrible mess of it. Professor Henry said he would never dare in his life to tell the Legis-

lature of the State of Wisconsin how much milk he spoiled every year in the dairy school. I would not dare to even figure on how much good stuff we are going to spoil at Davisville.

(The hour for adjournment having arrived, the Chairman reluctantly brought the discussion to an end and a recess was taken until 1:30 o'clock P. M.)

AFTERNOON SESSION—SECOND DAY.

WEDNESDAY, December 4, 1907.

THE CHAIRMAN. Professor Wickson desires to say a few words further on the subject we were discussing before we took our recess.

PROFESSOR WICKSON. I was complaining to the President at noontime that there was one thing I omitted to say this morning in the answer to Mr. Berwick's claim that that farm ought to be run as an income-payer. I perhaps conveyed the idea that we did not expect to do anything in that direction. Of course, that is wrong. The farm will be run on commercial principles with certain products and certain crops and at times when the special facilities are not directly used in instruction, and there will be an income, which, of course, will go into the funds for the maintenance. The creamery will be run as a commercial creamery all the year around, taking the milk from the University herd and buying milk from the farmers roundabout, so that that will be run for income on straight commercial principles. But during the time that that creamery is used primarily for instruction and men are employed to elucidate the operations and to expound the science involved in the handling of milk, and when the pupils themselves are required, as they will be, to take certain portions of milk and actually make certain butter and cheese themselves, then, you see, conditions come in that will militate against income to a certain extent, because the product which they make out of that milk will not be good. So that there is a divided motive in operation, and the idea of managing things economically for income is not lost sight of at all. But when it is clearly stated that the expenditure for instruction is something which one does not have to meet on a producing farm—and it is mainly for two things: first, the cost of instruction; second, the irregularity of the product and sometimes the actual spoiling of the product by those who are trying to learn; and those two together introduce an element of cost which is altogether at enmity with the idea of making the thing a successful producing establishment throughout.

And the cost of instruction is considerable; probably not less than \$15,000 a year will be required for special instructors who will be employed there, and that, of course, will be quite an item of expense in the operation of the farm. For that reason, I simply want to add to my previous statement that if I gave Mr. Berwick the impression this morning that the farm was to be run extravagantly and without the idea of making things profitable, that was not the impression which I intended to convey.

MR. GORDON. I understood that M. Theodore Kearney, of Fresno, left the State University a property estimated at a value of about one million dollars. I would like to ask Professor Wickson whether the University has got possession of it and, if so, what is the intention—is it to be kept as an experimental farm or what? I think it is due the fruit-growers of California to know something about that farm as well as about the one at Davisville.

PROFESSOR WICKSON. I am very glad indeed to make reply to that question. The Kearney estate is still in the courts; it has not been distributed. It is being managed by the executor. The trust company was executor under the will. There are certain contestants who have filed claims. The heirs of Denis Kearney, who died a few months ago, have their claims before the court, but no hearing has yet been had. There can not be a distribution, of course, until these claimants are disposed of. How long it will take them to make out their case, whether they can establish a claim of relationship, nobody can tell until it actually comes into court. As there has been no hearing, there is no date at which distribution can be expected. We simply don't know when that will come. The estate is being managed by the trust company as executor, and I understand that, owing to the particularly good prices of products during the last two years, a net profit of somewhere between \$70,000 and \$80,000 a year for two years has been made by the trust company, which goes into the estate. There is a considerable quantity of claims outside of direct incumbrances, debts of one sort and another, which this possible \$150,000 of net gains for the last two years will go toward liquidating. That business the trust company, under the court, is managing. The University has nothing whatever yet, except expectations. The plan which we shall carry out will be to follow as far as possible two things, one which we conceive to be of value to that district, and secondly, to observe as closely as possible Mr. Kearney's wishes as expressed in his will, and agricultural instruction and research covering both points. I do not conceive that it will be of advantage to us to operate anything like 5,400 acres of land. Probably two thirds of that can be sold and the money used as an endowment to meet the expenses of the institution which will be established there. I do not believe in selling it, however, until we do

something in the way of establishment, because just as soon as we do establish something the value of the land is bound to be advanced.

MR. BERWICK. I can understand very fully that a farm conducted on the basis of research would be a non-paying institution. I can not understand Professor Henry's remark about the quantity of milk the students spoil. I should suppose the instructor in charge of the plant, whether they are making butter or cheese or getting cream, would be the very one to see that there was no milk spoiled. I personally have taken green boys—it was an economic proposition—on my farm and made their work bring something into Berwick's pocket, and I see no reason why the State farm can not be run on that same basis. Our boys are pretty keen observers. If they see the thing run at a loss, what is the result? Instead of drawing boys back to the soil, the boy says, "No, sir; not for me. They can't make that farm pay its own expenses; I don't want any farm in mine." And that is the very wrong result that we do not wish to attain by this farm. Why Professor Wickson scouts the idea of its being a model farm I do not know.

THE CHAIRMAN. Mr. Stephens is now ready with his "Report of Committee on Transportation."

MR. STEPHENS. I have handed the report to the Secretary, who will please read it.

The Secretary read the report, as follows:

REPORT OF COMMITTEE ON TRANSPORTATION.

MR. CHAIRMAN: Your Committee on Transportation beg leave to submit the following report:

The Southern Pacific Company, through Mr. H. A. Jones, Traffic Manager at San Francisco, in a communication addressed to this Committee dated November 24, 1906, stated that the company had contracted for the construction of 6,600 refrigerator cars of the latest improved type and that they would all be delivered in time to be put into service to handle California fresh fruit shipments in 1907. Your Committee is pleased to say that the Southern Pacific Company kept this promise in full and that all other initial lines have acted in like manner. The cars are larger and better in all respects than those that had been in use, and we feel that we would be inappreciative and derelict in duty if we did not recommend that the fruit-growers in this Convention adopt resolutions commending and thanking the Southern Pacific Company and the other initial lines for their action in this matter.

We believe that the Southern Pacific Company, the Santa Fe Company, and the San Pedro, Los Angeles, and Salt Lake Company have by this elimination of the private refrigerator car lines done much to promote the fruit industry of California. It is now within easy reach of the transportation companies to more than quadruple our fruit shipments in short time by establishing and maintaining a reasonable FRUIT-TRAIN TIME SCHEDULE.

But time is necessary. The time made in the delivery of California fruit shipments at Eastern destinations this year was probably the worst in the history of such shipments. It frequently happened that cars were out 12 to 15 days to Chicago, and to points east of Chicago frequently from 16 to 18 days and in some instances 20 to 25 days.

As usual, the time made at the beginning of the season was better than the time made from about the middle to the close of the season, when the best possible service should be given to insure the arrival of the fruit in good condition at destination.

Some think that, as the days grow shorter and the nights longer and cooler, it is not important to see that the ice tanks are kept *full* and that fast time be made in the carrying of our fruit shipments.

Such ideas are erroneous, for the reason that fruit does not differ from other earthly things in its power of endurance, to which there is a limit. Fruit, when fully matured, soon begins to decay and becomes worthless, unless care and attention are given to prevent such a result.

Since the elimination of the private refrigerator car lines from the transportation service, the time consumed in the transit of our fruit shipments becomes the most important factor, and should be given paramount consideration, for upon improved, uniform and reliable time-schedule fruit-train service depends the development of California's great horticultural resources, which are yet, comparatively speaking, in embryo.

Additional facilities must be given by the transportation companies, for when the new acreage, which is very large, comes into bearing, and the many more acres that we are inviting and urging people to come to California to plant to fruit, also come into bearing, better time must be made in the transportation of our fruit products, or heavy loss will inevitably come to many growers.

What the fruit-growers desire is that the agreement entered into between them and the Southern Pacific Company on May 21, 1901, be put into effect, which was as follows:

SOUTHERN PACIFIC COMPANY,

SAN FRANCISCO, CAL., May 21, 1901.

MR. R. D. STEPHENS,

*Chairman Transportation Committee,
Fruit Growers and Shippers,
Sacramento, Cal.*

DEAR SIR:—

DECIDUOUS FRUIT TRAFFIC.

Referring to the memorial from the fruit-growers of California to the transportation companies through committee of fruit-growers, of which you are the chairman, and copy of which was duly furnished this office.

I beg to say that we have had extended correspondence with our connections, looking to a time-schedule on deciduous fruit from northern California, during the season now opening, that would be as far as feasible in line with the wishes of the fruit-growers.

As expressed to you when I had the pleasure of appearing before the Convention at its session in this city December last, it is the desire of this company to do its share in fostering the fruit industry, and lend it our influence in giving it satisfactory transportation.

Am now able to say to you accordingly that it is the intention of this company to run trainloads of fresh fruit from Sacramento to Ogden within 60 hours, provided, if there is but one train, it be ready for departure from Sacramento not later than 12 o'clock midnight; if two or three trainloads, it will be necessary that the first and second be ready to go out at earlier hours, say at 10 and 11, respectively.

The Union Pacific and its connections have authorized us to say that their time from Ogden to Chicago will approximate 84 hours for shipments thus delivered them in train-load lots, of which 24 hours will be consumed from Council Bluffs to Chicago.

You will observe that this will bring the fruit into Chicago in the early morning hours, as a shipment, for example, which leaves Sacramento on Monday midnight would arrive in Chicago on the morning of the following Monday—this, too, bearing in mind the two hours' difference in time owing to meridian.

If, when shipments begin in quantity so as to make up trainloads, shippers will so arrange their forwardings as to give the whole trainload to one connection through to Chicago, I believe you will find results justify the effort. This can be done without giving one line an undue proportion of the business, by alternating the lines over which the trains would move; but all notify us that unless they can get the fruit in trainloads, they can not make the schedule called for. It will make no difference in our time up to Ogden whether the fruit is there delivered to the Union Pacific or to the Rio Grande Western.

East of Ogden the Rio Grande-Pueblo route, recognizing the conditions under which the traffic moves, will aim to meet the time of the Council Bluffs route indicated in the foregoing.

Shipments for St. Paul and Minneapolis on the one hand, and St. Louis on the other, will be handled from point of divergence on the scheduled trains of the line handling the fruit from the Missouri River.

East of Chicago lines will handle as heretofore, the Erie Railroad Company notifying us that their high-class freight train, which carries the fruit, leaves Chicago in the afternoon, but reaches New York on or about 4:30 A. M. third morning, Philadelphia 6:30 A. M. third morning, Boston 4 A. M. fourth morning out from Chicago.

You are aware that the standard for fast trains carrying perishable freight from Chicago to New York is about 60 hours. Lines east of Chicago point out that to speed up their trains in this business would not mend matters, as the fruit would arrive either in the afternoon, or the early night hours prior to present arrival, and from either the shippers would derive no benefit as compared with present deliveries; further than this, the way is not clear to handling California fruit on faster schedule time than the perishable freight local to their own lines.

I trust that you will concur that the foregoing indicates that the expressions given your Convention of intention to go into this matter carefully, and endeavoring to meet the needs of the fruit-growers as expressed in that Convention, have not been lost sight of, but, on the contrary, are being fulfilled. We trust that the results during the season about to open will bring profit to the fruit-growers and renewed friendly relations with the carriers.

Will you kindly acknowledge receipt?

Yours truly,

WM. SPROULE.

We believe that the readoption of this time-schedule by the railroads, and its strict enforcement by them, would go far and do much to place fruit-growing in California upon a sound, paying basis. Such a time-schedule we believe would go far toward remedying an evil that has done much to retard the development of our horticultural interests, to wit: the fluctuations in prices for California fruit in Eastern markets.

When shipments that are sent out three and four days later than others consigned to the same place arrive and are sold at the same time, an over-supply is the result, which is not all, for the delayed fruit arrives in an impaired condition and brings a low and losing price, which price goes far toward fixing the price for the more sound and perfect fruit.

If this season's shipments that arrived in a decayed condition and were sold at a loss of from \$200 to \$400 a car could be eliminated from the total shipments for the season, a much better showing would be made in favor of our fruit interests, which, as a whole, is good, but unnecessarily impaired for the reasons above given.

In conclusion, permit us to say that there is no desire on our part to criticise the transportation companies for their unusually poor service given to fruit shipments this season, but, on the contrary, we wish to call the attention of the railroad officials to the evils existing in the present methods of transportation regarding fruit shipments, with the end in view and the hope that the fruit-growers of California and the officials of the transportation companies may get together and act in a spirit of amity and friendliness and adjust any and all differences of opinion that may exist in their minds as to what is best and should be done to promote and build up the fruit industry of California, and incidentally the interests of the whole State.

R. D. STEPHENS, Chairman.

ALEX. GORDON.

A. N. JUDD.

MR. STEPHENS. Now, Mr. Chairman, I move that that report be adopted, in order to bring it before this Convention if anybody desires to discuss it, and also that copies be sent to the different transportation

companies, which will show the feelings and wishes of the fruit-growers of the State.

The motion was duly seconded and carried.

THE CHAIRMAN. The report is accepted, and before you for discussion.

MR. STEPHENS. Mr. Chairman, I simply wish to say that the committee has labored with a view of bringing this matter before the attention of the transportation companies, and hopes, as expressed in the report, that there will be opportunities given to the growers and also the officials of the transportation companies to take into consideration this matter. I have had the pleasure of meeting some of the officials of the Southern Pacific to-day and they think there are suggestions in that report which will result beneficially to the fruit-growers of California. What we want is not antagonism between the railroad companies and the fruit-growers, but we want to work in harmony with them and we want to do everything possible to bring about a better condition in the transportation and marketing of our fruits. The elimination of the private car line has removed a very great obstacle and bone of contention. Heretofore, in conventions, up to the last season, we had troubles over that question, and they have been of such a character as to instill feelings of prejudice. The elimination of those car lines has brought us right down to the question of transportation. Now, you see, we are making progress, and if we can keep on making progress along these lines instead of creating discord, as in the past, there will be nothing but harmony. The object of the committee has been to bring about such a condition, and we are very pleased to know that there are no objections, so far as any manifestation of any member of this Convention is concerned, and if there is a gentleman or lady here who thinks there is anything wrong in that report the committee would be very thankful to have a suggestion as to what is wrong, and if based upon good grounds we are willing now to amend it. (Applause.)

THE CHAIRMAN. Mr. Alden Anderson's papers are both combined. He gives the report of the California Fruit Distributors and also "Widening our Markets." Mr. Isaac will now read Mr. Anderson's paper.

The Secretary read Mr. Anderson's paper, as follows :

REPORT OF THE CALIFORNIA FRUIT DISTRIBUTORS.

By HON. ALDEN ANDERSON, OF SACRAMENTO.

The shipment of deciduous fruits to Eastern markets for the season of 1907 to date follows, together with shipments of 1906 for comparison:

	1906.	1907.
Cherries	150	98
Apricots	16	71
Peaches	584	699
Plums and Prunes	1,220	1,039
Pears	1,513	1,039
Apples	748*	1,067†
Miscellaneous	22	18
Grapes	2,052	3,460
Totals	6,305	7,491

* Shipment to December 20th. † Shipment to November 29th.

A study of the figures given, together with a study of the statistics of the shipment of deciduous fruits for the last six or eight years, will show that this year there was not an excess of shipments of any one variety of fruit over any other previous year, with the exception of grapes, and on some varieties the quantity is considerably below the average.

One of the reasons there were not greater shipments in some lines was the fact that we had a very cold, rainy spring, which interfered with the blossoming and "setting" of the fruit, hence short crops, particularly in some districts. Another reason was the fact that fruit of the varieties also used for canning or drying was salable at good prices at home and there was no necessity for Eastern shipment to secure remunerative returns.

The increase in the shipment of grapes is very significant, and as there is considerable acreage that will still come into bearing in a year or two it will be reasonable to expect, under normal conditions, an increased shipment over this year, and as I have been requested to say a few words on the subject of "Widening our Markets" I will particularly use the grape shipments as my text, as under normal conditions we will have a greater increase of shipments of this fruit than of any other.

There was a fair crop of grapes, but the increased acreage coming into bearing was responsible for the increased shipments more than anything else. In 1906 there were 2,052 cars (the heaviest shipment to that time) shipped, and this year there were 3,460, or 1,408 cars more than were ever shipped in any one season before.

Sales of grapes this year have been very variable. Some varieties, particularly in the early part of the season, sold for higher figures than

ever before, while in midseason the same variety of grapes from one district would bring very satisfactory prices, while from another district the sales would be at a considerably less figure and not nearly so remunerative. The reports from agents and the general response to inquiries as to the reason of low range of prices invariably brought back the reply that those of lower sales were in poor or poorer condition.

Therefore, in considering the possibilities of widening our deciduous fruit markets I can give you, in a very few words, my opinion or judgment of the best way in which to widen them at the present time or to prepare for the necessities of the future, and that is, *better transportation service*. I do not say this in a spirit of fault-finding or of captious criticism, but simply make the declaration as a statement of fact. I am quite willing to acknowledge that the fresh-fruit products received probably better attention this year from the transportation companies than any other commodity, but at the same time truth compels the declaration that the service given, particularly as regards length of time en route, was wholly inadequate to permit the obtaining of the best results on shipments.

In considering the distribution of California table grapes there is a factor that must always be given certain consideration, and that is the importation of Almeria grapes. This year to date there have been imported from Almeria 858,962 barrels of grapes, as against the total importation of 548,000 barrels for the season of 1906. This quantity is equal to 2,226 cars of California grapes and when imported they are packed in sawdust, suitable for storage or long-shipment purposes. I have frequently, by correspondence or personal inquiry, endeavored to get the opinion of people engaged in the handling of fruit in the East as to the competition of these grapes with those from California, and the invariable response has been that the best varieties of California grapes, *in good condition*, are generally given the preference by the trade and the consumer.

Let me quote you a few reports received by me recently from the East as being typical ones. I would particularly have you bear in mind the declaration in all of them that "if Californias are *in good condition*" has been invariably italicized.

From New York: "California grapes are invariably given the preference over Almerias if *in good condition*, but the Almerias are packed in sawdust to keep a long time and when California grapes are eighteen to twenty days in transit and berries are dry and moldy and shake from the stems upon being taken from the baskets the trade can not and will not pay the prices that they would if these grapes could be gotten here in strictly first-class condition. If grapes arrive in strictly first-class condition, which they do at times, the sale price, as you yourselves know, invariably shows that they sell at higher prices than any other kind of grapes offered on this market."

From Philadelphia: "About twelve thousand barrels of Almeria grapes have been sold here this week, six thousand being sold on Tuesday, November 5th, and about the

same number was disposed of to-day. We have made an effort to get the consensus of opinion among the trade as to the competition of Almeria with California grapes. Without a single exception we have found that the dealers much prefer the California product, if in good condition. This has always been our opinion, and we have recently advised the shippers of California Tokays that although receipts of Almerias were heavy, good California grapes have always, and will continue to have, the preference with the trade. Many of the large dealers here have informed the writer that consumers generally have shown a great preference for California fruit."

From Pittsburg: "Replying to your inquiry as to the effect of the sale of Almeria grapes on California grapes, we would say that after studying the matter over carefully we have come to the conclusion that the trade here prefer good California grapes in good condition to the Almeria. We regret to say, however, that much of the offerings of California stock this year have run to fruit in poor condition. People on this market in our opinion much prefer the California grape to the imported one, and this statement is borne out by what the trade will pay for Californias in good condition in comparison with what they will pay for the imported goods, and if the condition of all California grapes being offered was as good as the Almerias being sent here the imported article would not have as much standing on this market as it enjoys at the present time."

From St. Paul: "The trade here will not take Almeria grapes as long as there are good California grapes on the market. We believe there never have been so many Almeria grapes on this market as there are at present, and there have been fewer sold up to the present time than any previous year."

From Boston: "California versus Almeria grapes. It is our opinion that while the trade here prefer Tokays, as well as Cornichons and Emperors, in good condition, to Almerias, it is nevertheless true that on account of the long time in transit, which makes Tokays, especially, arrive in such poor condition, a great many orders from interior New England points, which would have been placed for Tokays, have been switched over to Almerias. Many California grapes that have arrived here lately have been in poor condition. They are not fit to go away on orders and have to be absorbed by the local trade. If the railroads would get these cars to Boston in from eight to ten days instead of from fifteen to twenty, there is no doubt but what the California grapes would receive the preference at all times and there would be very little demand for Almerias, and there would be less and less imported as time goes on."

Now these expressions, as I said before, are typical ones, and they all go to show that if we are to expand our distribution beyond the requirements of local markets at places of receipt we must get them there in the very best condition.

I have no hesitancy whatever in declaring that if our grapes could have been transported this year on a seven-day schedule to Chicago and a nine-day schedule to New York we would have received \$250 per car more than we did receive for the product shipped; and while the time on many of the shipments has been good, on other shipments it has been very, very bad, and on the long-time shipments relatively the greater amount of money is lost or not received on account of the condition of grapes on arrival.

The average time on grape shipments this year from shipping points has been about twelve days to Chicago and common points and sixteen days to New York and common points, while we have had cars fifteen to sixteen days to Chicago and twenty-one to twenty-two days to New York.

When grapes go forward in first-class cars and are well iced and given

good attention in that respect, they will not deteriorate as much with this extreme length of time in transit as they otherwise would; but any one who is at all familiar with the subject will acknowledge that grapes put on cold storage at home without the incident of transportation would deteriorate greatly at the end of a period of sixteen days, to say nothing of adding the time for the exposing and sale to the consumer of the product beyond that time.

The energies of growers, shippers, and this Convention should be bent in the direction of using all possible persuasion, arguments, facts, and figures with all transportation companies interested to get them to give us and maintain a schedule of seven days to Chicago and common points and nine days to New York. I believe that such a schedule that can be counted upon and maintained will do more to widen the distribution of California deciduous fruits than any other line of endeavor that can be undertaken at the present time.

Sacramento, December 2, 1907.

MR. STEPHENS. I wish to say that in keeping with the statements there I have the official reports here. I will read just a few. Here is a car that was shipped to Philadelphia; was out 21 days. Car to Boston, 25 days. Another car to Boston, 22 days. Car to New York, 22 days. One shipped to Chicago, 16 days. Another one to Chicago, 17 days. Another one to Chicago, 19 days. Another one to New York, 21 days. New York again, 21 days. New York, 19 days. New York, 20 days. I only make this statement to show you that the statements made therein, both in Mr. Anderson's report and in the Transportation Committee's report, are verified by facts. I think Mr. Anderson is a little in error about the average time; I think the average time is longer than that which was given. But I am very glad to be able to state to you that, for the first time, I think, in the history of fruit-growers' conventions, Mr. Anderson and myself are in sentiment agreed that we believe the most important thing to be taken up and considered is the transportation question; that transportation is the question more important than all others combined having bearing upon the horticultural interests of this State. Now, the officials of the different transportation companies should take notice of these two reports and go at the question with a determination to give us better time, as the Southern Pacific Traffic Manager, Mr. Sproule, did, in 1901, and put that into force—make out a time-schedule you can depend upon, so that a shipper will not ship five cars to New York to-day and five to-morrow and five the next day and have them all arrive there the same day. To illustrate: we had a car shipped at a certain date; we had another car shipped on the same date. Something happened to that car so it had to be transferred. It was about three days later, and the time made on both of them was very bad. They both went to Pittsburg. One was 18 days and the other 23 days

to Pittsburg—5 days longer—and it made just \$100 a day difference in the sale of that fruit. There was \$500 difference between the sale of those two cars. This shows conclusively the importance of good time. Of course, we put in a claim. What became of it I don't know, but I think the railroad company will allow it. In the quantity of cars that have been sent forth and that will be sent forth in the future you will see that \$100 a day difference on each car means millions of dollars to the State of California, and therefore I can not repeat too often that this is the paramount question. It has more bearing upon the future prosperity of the fruit-growing interests of California than any other, and I feel optimistic. I believe the officials of the railroad company will take this matter up and give it due consideration. I feel that if we urge it in the proper spirit and the proper manner they will do this for us, because it will be in their interest to do so. Mr. Anderson says that the fruit shipments were very small in comparison with what they had been. That is true. My crop of fruit was about twenty per cent of what it was last year, my neighbors' about the same, and the loss prevailed almost throughout the State, with the exception of a few localities. That shows that if we had had a full crop this year, instead of having 7,000 and some odd cars, we would have had 10,000 or 12,000 cars, so it makes this question of transportation more and more important. Next season, if we have a full crop, and we have as good a grape crop as we have had this year, you will see from 10,000 to 12,000 cars shipped, instead of 7,000, and therefore it becomes important that this interest should be given due consideration. What we want is a time-schedule that we can depend upon, the same as a passenger train, or so that we will not pile up our fruits and our shipments in different markets.

MR. BERWICK. Mr. Chairman, I am very glad to see our Convention so harmonious in this matter of transportation. We have had it sometimes rather acrimonious than harmonious, and I think we owe a very big debt of thanks to Mr. Stephens for his persistent and indefatigable opposition to the private refrigerator car lines, and I beg to move that this Convention tender its thanks to Mr. Stephens for his long, continuous, persistent warfare and final victory in the passing of private car lines. I move a rising vote.

The motion was duly seconded and was carried by a unanimous rising vote, with applause.

MR. STEPHENS. I wish to say that I feel greatly complimented, far beyond anything I am entitled to. This vote of thanks is full compensation for any services I may have rendered in this matter, and I feel that another vote of thanks should be tendered, as suggested in our report. I feel that when there is a disposition manifested on the part of any person or any interest to do that which is right; if they listen to reason or feel that it should be recognized and considered; therefore,

Mr. Chairman, I move you that a vote of thanks be tendered to the Southern Pacific Company and all other continental lines for the elimination of the private car lines from the fruit transportation service.

The motion was duly seconded and carried unanimously.

THE CHAIRMAN. I wish to inquire if Mr. Bowers is here or if his paper, the report of the Committee on Prunes, is represented?

MR. CRANDALL. As a member of the Committee on Prunes, I will state that neither of the other members, Mr. McDonald or Mr. Bowers, is here, and owing to unavoidable circumstances, the sickness of Mr. Bowers and the absence from the State of myself, there has been but one meeting, and therefore there is no report to be made.

THE CHAIRMAN. I would like to have Mr. Isaac read a telegram which he has received, and that will set another good man right with us.

The Secretary read the following telegram:

PALO ALTO, CAL., December 4, 1907.

MR. JOHN ISAAC, *Fruit-Growers' Convention, Marysville, Cal.*

President Jordan is delayed on account of illness. Can not reach Marysville to-day.

G. A. CLARK, Secretary.

THE CHAIRMAN. Now, we will hear from Mr. Judd, and his subject is "Tax Discrimination between Farmers and Cities and Towns."

MR. JUDD. Mr. Chairman, and Ladies and Gentlemen: I want to preface this paper with a remark or two. It may appear to you somewhat like our grain used to appear after we got through threshing in the early days of farming in the Pajaro. There was a good deal of reddish wild oats, and we had to keep the grain separated properly so we could tell which we had threshed. Now, there may be some cockle-burs and other things in this paper that a re-cleaning might improve, but I am going to charge up the whole field to Mr. Rogers and Mr. Isaac, who selected the article for me after presenting several to them for their approval. I want to say that, as I look at it, taxes are a burden upon an individual, whether it is done by a legalized assessor, or by a railroad company, or by a labor union, or by any other way in which there is unjust discrimination between the farmer and the balance of the country known as cities and towns.

TAX DISCRIMINATION BETWEEN FARMERS AND CITIES AND TOWNS.

By A. N. JUDD, OF WATSONVILLE.

During the framing of the new Constitution, the especial pet of the agricultural interests was Article XIII, on taxation. This particular article caused more public discussion than all the rest of the Constitution, and, when voted upon, the corporate interests of the entire State were lined up against the agricultural producer. However, right prevailed; but, as is often the case, what the corporation interests could

not accomplish by fair means they have done through their several legislatures, and by mutilation in amendments and legislative enactments have destroyed Article XIII to such a degree that a united effort is necessary on the part of the producer to bring about restoration through the courts. Perhaps the most revolutionary and gross violation was the Act of 1883, eliminating cities and towns from road districts, thereby exempting them from taxes for road purposes. This, I hold, is a great injustice, as well as being clearly in violation of Article XIII, Section 1, of the Constitution of California, where it says: "All taxes are to be equal and uniform." Again, same article and section: "To make a tax void the absence of all possible public interest must be shown clear and palpable." While the law of 1883 put upon us unjust burdens, it was left for the late lamented Legislature to wholly disregard our constitutional rights and, against good public policy, add more burdens, in which justice was dashed to the winds. I refer to the Act authorizing and maintaining boulevards, and the Act adding twenty cents more to the forty cents already paid on each \$100 by the farmer for road purposes. It appears that this twenty-cent law is not for general road purposes, but to make new roads and, as far as my observation goes, is for private parties, which is clearly class legislation. In further proof of the injustice of our road laws and incidentally of the exorbitance of the road tax in California, I quote correspondence from two counties, one each in Iowa and Illinois, which have practically no road material within their respective counties, and besides have to contend with winter frosts that each spring leave the roads in very bad condition:

ANAMOSA, IOWA, November 13, 1907.

MR. A. N. JUDD, *Watsonville, Cal.*

DEAR SIR: Replying to your inquiry addressed to the County Assessor, say: That we have a consolidated tax which includes State, County, State agricultural college, State university, State normal, poor outside the poorhouse, soldiers' relief, and 1 mill for school fund, bridges and roads. All property in the county pays the same levy to these funds.

Respectfully yours,

W. K. PEARSON, Treasurer, Jones County.

SYCAMORE, DEKALB COUNTY, ILLINOIS, November 14, 1907.

A. N. JUDD, *Watsonville, Cal.*

DEAR SIR: Cities and villages in Illinois pay the same rate of road and bridge tax as farm property.

Yours truly,

L. C. SHAFTER, County Treasurer.

I selected these two counties because they are well settled and each has many streams that demand much bridging, besides having considerably sized cities and towns. Jones County has an area of 516 square miles and a population of 23,000. DeKalb County has an area of 646 square miles, with a population of 35,000.

Is it not a bit singular that the entire agitation and support of our

iniquitous road laws come from cities and towns alone? I ask you by these acts do they show that "There is a clear and palpable absence of public interest"? Surely, if they have no interest in the public roads, why all these road laws made without our knowledge or consent while we have to pay for them?

Neither does their responsibility for, I might say, other crimes against us stop at unjust road laws, for they have otherwise tied our hands, causing less of production in the State and bringing nearly to a halt all progress in horticulture, because labor unions, governed by the foreigners who control them, and in combination with political timidity and economic stupidity, with the influence of the cowardly press in the large cities, have put a ban on the only means of procuring a labor supply sufficient and reliable for half our needs. While the farmer has always shown a kind and forbearing spirit with these un-American institutions, the last straw is on and we should call a halt, for they will find that the farmer is built on the lines of his ancestors, who have before saved this country from its enemies. Although he is willing to sacrifice much for defense, he does not like to pay unjust tribute by sacrificing all he has gained.

Again, the farmer sees a great injustice in assessing him year in and year out for the same old watch, gun, wagon, harness, horse, cow, dozen chickens, or fruit trees and vines for often more than they are worth, finally to become a total loss by decay or death, while the merchant, who turns over his goods from one to five times a year with a profit each time, is often assessed, fixtures included, for a little more than the fixtures alone are worth. Recently, when I called a gentleman's attention to the fact that his fixtures were assessed for a trifle less than 2½ per cent of their true value, his reply to me was, "It's dead stock!" The answer brought to mind my old horse, wagon, harness, farm machinery, and fruit trees, that are nearly ready for the scrap-pile and that have been assessed for all they are worth many, many times. This short-sighted policy explains the reason why the cities in California increase in population over 77 per cent every ten years and the country hardly holds its own, and for further testimony I call your attention to Bulletin No. 44 of the United States Department of Agriculture, where it says: "Inequality of taxes and lack of sufficient help is the cause of a large decrease in farm homes in forty of the states and also a decrease of owned farms in all of the states." To further elucidate I will call attention to Plate 5, Volume I, 1900 Census Report, which is very comprehensive. The blue patches which disfigure the entire map of the United States further demonstrate the loss of population in rural America. Again quoting from Bulletin No. 44:

"Chittenden County, Conn., farms are selling at a discount compared with the prices of fifty or sixty years ago. The lack of steady and reliable help is the cause."

"Worcester County, Mass., farms are not selling as well now as they did fifty years ago. High rate of taxation; high wages for poor quality of farm help is the cause."

"Farm lands in Washington County, Rhode Island, are greatly depreciated. The sale of a farm at a fair price is a rare occurrence. The labor question and high taxes play an important part in the decline of farming lands. Back from the trolley lines foreigners are taking up many of the abandoned farms; only a few American boys are taking any."

"Cattaraugus County, New York, is principally devoted to dairying. Lands are cheap and sales poor, on account of poor and scarce help. One reason of this is that the young men of to-day are getting a good education and ninety per cent of them will not work on a farm. Consequently the old people want to sell the farm. They can no longer run it themselves."

"In Columbia County, the correspondent says, 'I visited nearly every county in New York State buying cattle, and it is a fact a good farm with good buildings can be bought for one half to three fourths of what the buildings would cost to be replaced, in every county I have been through.'"

"Cortland County farms are neglected and help can not be had to work them properly. On $2\frac{1}{2}$ miles of road through our town there are about eighteen abandoned farms, meadows grown up to brush and weeds. A good many farms with fair to middling buildings can be bought for one fifth the price of a few years ago."

"Tioga County, 'If any one wants to get rid of his farm he simply moves off and the number of such farms is growing rapidly.'"

"Hunterdon County, New Jersey; Butler, Beaver, and Clearfield counties, Penn.: Farms are bought until very lately for the timber that is on them, but now pretty good farms for these parts have sold for about what the buildings cost."

"In many of the Southern States a great deal of the good land has not been cultivated on account of the poor and unreliable labor, and this is getting worse every year."

"Columbiana County, Ohio, farm lands have depreciated, simply because our manufacturing cities are offering better wages than we can afford to pay and hence our young men have drifted off to the shops and factories, consequently farms are put on the market to get rid of them at lower prices."

"Marshall County, Minn., the cause of falling prices is emigration of large numbers to Canada."

"Black Hawk County, Iowa," gives the same reason.

"Andrew County, Mo., large young orchards have been chopped down so that the land can be utilized for general farming. Scarcity of labor is the cause."

"Davis County, emigration to Canada has lowered the price of land." Same of Pembina County, North Dakota, also in Cloud County, Kansas, notwithstanding there are millions of acres of virgin government soil distributed over the latter states.

I quote the dark side of the picture all over the United States, for the purpose of showing that California is not alone suffering from the scarcity of help on the farm and being burdened with unjust taxes.

But to return. When the farmer is worn out by a lifetime of hard work, barely eking out an existence, scrimping to save for old age and to educate his children so that they may take their places in the world's affairs without being mocked, cartooned, or made a jest of; or even if, at an earlier date, he moves to town at an increased expense to give the children a little better chance for that much-prized education, he will find that his Nemesis, unjust taxation, has followed him. For he buys his little home, maybe three or four blocks from the business center; it has no income but is all outgo, and here again he adds in taxes much more than his just proportion of the tens of thousands of dollars that are often wasted for the purpose of alleged city government, which he soon finds is made for the sole benefit of a few blocks on

what is called "Main Street." Here he finds a difference in principle of distributing taxes for street purposes from what he was used to for road purposes in the country. There the wealthy and thickly settled sections help to pay for roads in poor, unsettled mountain country, while nearly the reverse is the rule in town. His little home is on a 50-foot lot; it is valued by the assessor at \$2,500; it would rent for \$20 a month, which would give a gross income of \$4.80 per front foot per annum, while on "Main Street," under the same valuation, there is had net, less taxes, an income of \$33.25 per front foot, renter often paying for all improvements and repairs. (And yet the Constitution says, "All taxes shall be uniform and equal.") It is on these three or four blocks of "Main Street" that enough money has been spent in the last thirty or forty years to pave the entire town with an indestructible pavement, provided, of course, that the money had been intelligently spent; but what are the final results? Perhaps three blocks of a nondescript pavement, which does not like to lie still when the sun shines and besides pleases no one. Here is where the city engineer changes the grade every time he is called upon to establish a sidewalk, gutter, street, or crossing. Here is where he insists upon running all the water on the wrong side of the street, thereby choking the six- or eight-inch outlets that more than three times the amount of water is supposed (by him) to go through, and which are intended to drain the largest part of the city. Now, if by these engineering feats your sidewalk is under water when it rains, you can stay at home. It is on these few blocks where you will find some moral cowardice and even sometimes business graft, born of that much abused abomination the "Indigent Fund," the beneficiaries seldom protesting against a wholesale robbery of the taxpayer, so long as they get their pound of flesh, even if it does perpetuate in office the worst kind of political graft. It is on these few blocks that are to be found all the deadfalls, which debauch the old and corrupt the youth, and where are committed practically all the crimes that cost so much. It is here where all the sweeping and daily hauling of their own dirt are done and where the police force and night watchmen hang out; and yet, notwithstanding all this, as well as the manifest injustice of unequal taxation, there is a fascination about city life that causes many of the farmers' boys and girls (Bulletin No. 44 said 90 per cent) to leave the drudgery and the much-vaunted independent life of the farm, to accept less wages found in the city. Perhaps I should qualify the last statement, for it is a conceded fact that the farmer boy usually inspires confidence in places of trust and sometimes supplants the too-often dissipated city youth. It has been suggested to me that this is one of the reasons for the extreme solicitude for the agricultural interest manifested by the city folks whose especial prerogative is to get up literature

to show the best side of country life and to enumerate opportunities for horticulture and manufacture, but who studiously forget to mention that in their town there is any opportunity in the professions, merchandising or trades.

To more fully show you the picture, true to life in California, of injustice the farmer receives and the moral turpitude of the tax-shirker, I quote from Controller Colgan's report of 1906: "In 1861 personal property was equal to 50 per cent of the total taxable property in the State; to-day it is slightly above 16 per cent. In the last thirty-five years we have had an increase of \$50,000,000 of personal property in the State, and in the same time an increase of \$1,335,000,000 in real estate and improvements. In the last five years the increase of inside personal property is \$16,000,000, outside personal property the increase was \$20,000,000; inside real estate and improvements increased in the same time \$201,000,000, while outside the increase was but \$85,000,000." Does this look like a manifest discrepancy, or do things get lost in town when the assessor comes around? And money, too, often gets away, for there is not enough turned in to the assessors in the whole State to pay the first installment of State and county taxes; but if we include all the solvent credits with the money and they would be taken for taxes, eight of the fifty-seven counties could pay all their taxes, fifteen could only pay one half, and ten one third. The rest range down to one thirteenth, except one county, which turned in \$350 of money and solvent credits, with taxes due amounting to \$56,446.77, yet strange to say the county was delinquent only \$630.23. Not a bad showing compared with any other county!

In conclusion, I will quote from an editorial of a leading country daily, which was for the purpose of inspiring confidence in the ten State banks and one National bank of the county. (All of these banks, by the way, in 1906 turned in to the assessor a total of less than \$80,000 of money and solvent credits—not enough to pay one third of the State and county taxes of that county.) The editorial in part says:

"The loans of these banks in the county on stocks and bonds, the only security that has varied in value during this stress, only amount to \$355,231. This is less than 6 per cent of their resources, and if every dollar of this amount was lost it would be more than covered by the surplus of these banks and could not impair capital or disturb depositors. Loans on real estate of these county banks amount to \$2,305,540, and, with the real estate holdings in the banks, make a real estate security exceeding two and one-half millions of dollars. The banks hold in ownership of stocks, bonds, warrants, and other personal securities, \$936,164.88. The First National Bank gives the following report, which is to the Federal banking authorities: 'Loans and dis-

counts, \$248,531.16; United States bonds for circulation, \$100,000; other bonds and securities, \$221,243.44; cash and sight exchange, \$231,936.59.'"

You will notice that, exclusive of the two and one-half millions loaned on real estate secured by mortgage, the assessor failed to get four per cent of what appears to be taxable property. How many counties in this State are similarly situated? Would it profit the public in general if the assessors would get busy? Has the public concluded, by reading Controller Colgan's report for 1906, that there was, in reality, no money in the State, and that it would be sold out for taxes, hence the late financial flurry?

In summing up the case, the farmer finds that he is never represented in the courts or the legislature. He finds that he is obliged to move to town to get the advantages of schools. He finds that his interests are looked upon all over the United States as the goose that lays the golden egg and a safe beast of burden to carry the responsibilities of the tax-shirker. He finds that in one or more counties of California he is paying eleven times as much for the support of schools, bridges, and roads as is being paid in some counties of Western states that have as good or better schools, bridges, and roads, and also that he has but a small voice in electing the men who spend the money. He finds that his interests are being sacrificed on the altar of prejudice in order to carry out the ideas of an un-American institution born on foreign soil. While in the East he finds himself looking back at the old, abandoned homestead, whose destruction is a monument to the greed and avarice of his fellow men, in the Middle West, through more congenial and equitable laws of Canada, a foreign country is sapping the life blood of the country, as well as depleting the ranks of the once defenders of the nation's life. I predict that when California is as old the conditions will be as bad, unless it is rescued from the hands of incompetent men controlled by unscrupulous tax-shirkers. To show you that it is no dream, note the increase, in the cities of California, of \$201,000,000 in real estate and improvements in five years—nearly two and one-half times greater than the increase in the country for the same time. Yet the country's increase in personal property is one fifth larger than that of the cities; although on the farms there are no banks, no department stores, no merchandising or manufacturing, and no Nob-Hill castles to furnish. What think you?

Is it time to begin to assert ourselves? Shall we proceed to wipe out the unjust laws, or just "resolve"?

THE CHAIRMAN. The next number on the program is a very interesting subject by Mr. Paul Shoup, "Common Interests of Fruit-Growers and Railroads." Ladies and gentlemen, I have great pleasure in introducing Mr. Shoup. (Applause.)

COMMON INTERESTS OF FRUIT-GROWERS AND RAILROADS.

BY PAUL SHOUP, OF SAN FRANCISCO.

Three years ago the pleasure was mine of addressing the State Fruit-Growers' Convention at San José. Since then many transportation changes have taken place. Some have affected the relations of the railways with the public at large; some more especially the relations of the railroads with the fruit-growers.

Nothing, however, has happened to change the belief then expressed; the final just determination of the relations between the public and the railroads, and what is due each from the other, will come only through a thorough understanding and appreciation by each of the difficulties, trials, and limitations of the other. The affection we have for our friends, and our steadfast confidence in them, are not created solely through knowledge of their strength and virtues, but as well through knowing their troubles and their limitations.

The railroad man in a place of responsibility who has no interest in the business and welfare of the road's patrons, but performs his work in a purely routine way, is not fit for his job. With changing conditions and new problems, that man will have no way ready to meet them. On the other hand, the shipper who blindly demands a certain unvarying service from the railroad, knowing nothing of transportation and caring nothing for the factors that give it uncertainty, in his criticism helps to create antagonism detrimental to all, helpful to none.

A third person need also be considered, one who may be sincere and honest but is neither shipper nor railroad man, and is apt to be without knowledge of the real needs of either. Too often he believes himself a law-giver. He spends one day or two investigating transportation problems that three generations of shippers and railroad employes and managers have struggled with. After a session of an hour with himself and the study of magazine and newspaper clippings, he formulates solutions which he hopes may be accepted by the public.

He never had charge of a train in the face of a mile washout in a storm, with an ax, a crowbar, and a lantern to make repairs. He knows nothing of the game of chess involved in keeping a dozen trains of constantly varying speed capacities moving on a single track over a mountain top against another dozen to be kept moving in the opposite direction, and all within a few hours of each other. But in an hour's speech he can tell you that the railroad must be made to move its freight with unvarying expedition or suffer.

He does not consider that a railroad has not the slightest control over the destinations of its own cars or the cars in its service. He does not realize that the shipper says where these cars shall go and gives

them destinations all over the United States, and that the cars received by the road are largely dependent upon the directions of shippers in other sections of the country, maybe thousands of miles away. He does not know that no railroad can tell a day in advance the volume or direction of the tide of traffic, nor gauge accurately what kind of traffic or where at any of its two thousand stations may be offered the next day. No matter how great the magnitude of the country's commerce, nor what unexpected demand may arise in some remote place, our friend will insist that the railroad must immediately furnish cars ordered or suffer fines.

Perhaps, with honesty and sincerity, but without any investigation into the cost of railway maintenance or transportation or construction, without consideration for changing commercial conditions or the nature of the different classes of transportation afforded, or the varying country through which to be given, he will in an over-night committee session prescribe blanket freight and passenger rates. If there be objections he says cheerfully, "Let's try it on anyway and see what happens," following the example of the doctor who always hoped his patient would survive even though he did prescribe for him.

Also our friend will instruct the railroads as to the double tracks they should build, the new depots they should construct, the hundreds of engines and thousands of cars they must buy, and above all the new lines into unknown country they must lay; but all this without a hint as to where the money is to come from to do the work.

Now, the problems of transportation are of as much importance to you as to the railroad. You want conditions to be such as to give you service—good service. Scores and scores of times, business men have said to me, "Your rates are all right; they're not hurting us; we don't care so long as we get the same as the other fellow; *but give us service.*" If you ship for a certain market, the vital element in transportation is that your product reach its destination for that market, as, for example, oranges for holiday trade. If you buy for a certain market, say Christmas gifts for the holidays, the important element is that the goods be received in season. Now, anything that impairs the efficiency of this service, anything that prevents the growth of railroad facilities to meet the growth of commerce, is of real interest to you.

These problems of efficiency as well as of rates are not to be settled by *ex parte* judgment or perfervid oratory. They are to be considered without confusion, one at a time, after careful consideration from all points of view, in the same, sober, common-sense manner you treat other business problems. About some of these problems I wish to speak a word before we are through.

Usually there is publicity for the things the railroad has not done. Its shortcomings have a thousand voices. Once again, I ask your indul-

gence in listening to statements of a few things the Southern Pacific Company has done, or is doing, to solve these problems in which we all are mutually interested. These are not offered in the light of defense, but as improvements in which I believe you have a personal interest.

The greatest freight transportation problem faced by the railroads is the movement of California green fruit so deftly and quickly that in a trip of two thousand or three thousand miles, or may be to London or Paris, its color, its fine aroma, its delicate texture and flavor shall be as perfect as when taken from the tree or vine in the sunshine of California. Through heat and cold, over high mountains, across deserts and wind-swept prairies, your fruit must be carried quickly in an environment of even temperature.

Three years ago we depended upon a refrigerator company of independent Eastern ownership to supply our green-fruit shippers with cars. The agreement with the Southern Pacific Company provided for cars up to five thousand in number—a number now insufficient. Some of the gentlemen here present will remember the discussion in relation to the Southern Pacific furnishing its own cars. At that time I gave \$8,000,000 as the estimated minimum cost of seven thousand refrigerator cars, and stated the fact that the freight charges the Southern Pacific alone would receive from the movement of green fruit under ice would not pay interest on cost, taxes and repair charges on such equipment.

Later, conditions became such that it was necessary to give further consideration to the car supply. And here I wish to point out to you the benefit of associated ownerships of railroads—of consolidation, if you will. That which the Southern Pacific alone could not afford as a business project to undertake, because of the number of cars required in relation to its individual haul, the lines associated under the presidency of Mr. Harriman could and did undertake—all having an interest to be served by such an enterprise. Thus was born the Pacific Fruit Express.

I have heard some criticism of the merging of interest of the Union Pacific and Southern Pacific railways. Why, is not apparent; no one can point out harm resulting. There has been no curtailment of service, no raise in rates as a result. On the contrary, the evidence in behalf of its benefit to California is overwhelming.

At the time of this association of interests the Union Pacific had reconstructed, Omaha to Ogden, a fine highway, but only half the way. The Central Pacific needed reconstruction badly. The line was congested. California products could not be moved with any degree of certainty whatever; very well I remember studying the tissue sheets of car movements to locate cars thirty days out and not yet into Ogden, before and during reconstruction. With the present tonnage, actually more than double that at the time of consolidation, the old Ogden

route would be with its grades and curves completely blockaded. But the association of interests has resulted in the expenditure of almost \$40,000,000 in reconstructing this main highway, Ogden to California. It extended the interest of Eastern men of wealth and enterprise to the Golden Gate. Since that time the energy and money commanded by Mr. Harriman and his associates have been given without stint to the development of California commerce and California's transportation facilities, whether the job be one of creating mammoth ships to carry commerce to Asiatic shores, the capture of a runaway river that threatened to engulf an area larger than many an Eastern state, the construction of a double-track water-level railway across a bay and through five hills into San Francisco, or the creation in two years of 6,600 refrigerator cars, the best yet built, to carry your green fruit to its market in the best possible condition.

The cost of these cars exceeds considerably the estimate made for 7,000 cars three years ago, because these are much better cars—by far the most expensive refrigerator cars yet constructed, with the largest loading capacity. The average cost is \$1,750, a total of \$11,550,000 for the 6,600 cars received to date. They were built by the Southern Pacific, Union Pacific, Oregon Short Line, and the Oregon Railway and Navigation companies to care for the fruit business originating on these lines, ninety per cent of which grows in California. To insure greatest efficiency in operation, a separate company, the Pacific Fruit Express, was originated to look after the distribution, use, icing, etc., of these cars. It has its own representatives, but all agents and departments of the Southern Pacific give these cars the same consideration as if they were directly operated. The cars were built specially for fruit transportation. The inside dimensions are: length 32 feet 11¾ inches, width 8 feet 2¾ inches, height 7 feet 1 1-16 inches, outside length 41 feet 10 inches. I believe the shippers who have used them agree that these cars give better service than any other without question. The large inside dimensions make it possible to load the product low, giving full efficiency in refrigeration. The Bohn patent ice tank, proved to be the best made, is used.

Icing is done carefully, and shippers are invited to visit the plants, to inspect the methods, and to satisfy themselves they are receiving all they pay for.

During the season ending October 31, 1906, 5,930 cars of deciduous green fruit were shipped East; this season to November 1st, 7,048 cars. This has been the banner year in the green-fruit business. California has received more money net than during any previous season. Many cars of fruit brought over \$2,000 each, while cherries in a number of cases ranged from \$3,000 to \$5,000 per car. The total northern California shipments of vegetables, green deciduous and citrus fruits, during

the season just closing have been 10,912 cars, nearly a thousand more than last year. From southern California the shipments via all lines were 27,533 cars of citrus fruit and 3,477 cars of vegetables.

The prospect for this season is good. Since October 1st over 450 cars of deciduous fruit and 1,400 cars of oranges and lemons have been shipped from northern California—a far greater number than during last year's corresponding period. The present outlook for the southern California citrus fruit crop is 32,000 cars, and 4,000 cars of vegetables—this season, altogether, spelling prosperity in capital letters for California fruit-growers. There has been no shortage of cars so far save a very temporary delay in getting in a supply to the Porterville district, a trouble quickly remedied by borrowing from our neighbor; and without minimizing the difficulty in distributing cars in the face of a tremendous freight movement, the Pacific Fruit Express and the Southern Pacific expect to meet the situation throughout the winter satisfactorily.

The ice shortage of last season is being met by the construction by the Pacific Fruit Express of two great ice-making plants, one at Colton and one at Roseville, to supplement the private companies' supplies; and other plants will be built if needed. Other cars will be constructed as business demands.

The precooling process has not quite passed from an experimental stage. The system being experimented with at Roseville bids fair to prove satisfactory; if so, it will mark a great improvement in fruit transportation, and the gentlemen originating it are to be heartily congratulated.

The refrigerator cars are not only expensive, but because of their weight and their relatively less carrying capacity than ordinary box cars, they are not economical cars to use in the transportation of the majority of other classes of freight. The gentlemen here present interested in the dried-fruit and canned-fruit industries are therefore more concerned with the prospect for increase in other equipment, such as box cars; and you are all concerned with the condition of motive power. But I wish to say here, that we are called upon to face a peculiar situation in the matter of car supply for the fruit industry. Of the total tonnage loaded on Southern Pacific cars last year, only 5.78 per cent—less than 6 per cent—was fruit of any kind: green, dried, or canned. I suppose the green deciduous fruit aside from oranges represented about 1 per cent, and with oranges possibly 3 per cent. The figures for local movements are not easy to obtain. Our total freight equipment last year was 44,294 cars. The Pacific Fruit Express has for service 6,600 cars, or about 15 per cent of those devoted to other service.

These figures indicate relatively how well the fruit traffic has been

cared for in California, for practically all of the Pacific Fruit Express cars are now engaged in serving your shipments and will so continue throughout the winter. The refrigerator cars cost twice as much as ordinary box cars, and in proportion to the actual tonnage loaded are more plentiful. This recognition of your green-fruit industry should be gratifying to you. You have captured fruit markets half way round the world in one direction, and I think I may safely say half way round in the other direction, too. And the management of the Southern Pacific is glad to feel that it has had some part in this spread of California's influence. The value of the fruit industry to the State is recognized to be out of all proportion to its tonnage; it is a great factor in bringing us wealth, in advertising our State's resources, in attracting people from all over the globe.

The increase in other equipment received or ordered since 1906 is in proportion to the demands of commerce. The last two years have been a trying time for shippers and railroads alike. All over the United States commerce has outgrown the railroads, and even where money has been available to develop the railroads it has been difficult, as in other lines of manufacture, to secure within the ordinary time, or double or even treble the ordinary time, cars, rails, engines, structural material, and the thousand and one mechanical parts absolutely necessary to a railroad machine, whether an engine slide valve, an air brake, or a patent coupler.

The Pacific System of the Southern Pacific had, in 1906, 1,198 locomotives and 26,148 freight cars out of the total already mentioned. Since then 184 locomotives and 5,429 freight cars have been received or ordered—an increase in motive power of 16 per cent and in freight cars of 20 per cent. Our latest reports indicate an increase in tonnage up to June 30, 1907, of 11.2 per cent and in car mile movements 11.1 per cent and in train miles 11.1 per cent. But the new freight cars are much larger than the old; the engines more powerful. Therefore, to meet your needs during the coming year we will have an increased efficiency in freight cars of probably 25 per cent and in locomotives of 20 per cent, whereas no such increase in business is now demonstrated. The prospects for better service are therefore much brighter. Of course the Southern Pacific is, however, affected somewhat by the car and engine conditions on every other road in the United States, with all of which we exchange business. If they are unable to meet traffic demands, cars which should be returned promptly to the owner move slowly and in some instances can not escape homeward from local shippers. The problem is not local to California, nor to Western railroads. But all indications point to better service. There is a further favorable factor. The value of cars lies not in their numbers alone, but in the rapidity with which moved. All summer the Southern Pacific has had

thousands of men employed in supplying additional track facilities. You remember the floods of last spring—the residents of this section do surely—when our line suffered from the greatest washouts in its history, scattered all over the State. After repairs were made—a veritable task of reconstruction—the ballasting of tracks, the relaying of new ties and rails began and has proceeded vigorously throughout the summer. The work between Sacramento and Truckee on the mountainside, to afford train-passing facilities, will illustrate what has been done to meet the new demands of California commerce. It is a road built up a mountain wall, and every foot of level earth on which to lay tracks must be stolen from the mountains. After thirty-nine years of development, twenty-four passing tracks had been built between Roseville and Truckee, having an average length of 1,900 feet. Each of these during the summer was lengthened 700 feet, enabling our operating department to make up trains of forty-five cars with three huge engines, instead of thirty cars with two engines. This work, now finished, practically increased the track facilities of the line over the mountain 50 per cent, and thereby the capacity of the Ogden route for handling your freight 50 per cent.

I will ask your patience to listen to only one more matter of detail in connection with railroad improvements. It marks, however, a great advance. During the last two years the Southern Pacific and Union Pacific have been installing the greatest and most modern safety block system in the United States. At an expense of \$5,000,000 this system has been installed over 4,592 miles of track. It constitutes a far greater mileage than that of any other railway system, and indeed is about one third of the improved block mileage in this country. The block system of signals makes for efficiency, for steadiness of movement, and for the more rapid transportation of both passengers and freight with safety.

In setting forth the railroad side of the question there is no disposition to overlook or minimize your difficulties, your necessities. I am trying to show that they are appreciated, and that strong efforts are being made to meet the conditions presented. Railway service is as much a factor in your prosperity as are the cultivation of orchards, the fighting of disease, rainfall and irrigation, and other home problems.

I want to ask your consideration for some of the railroad troubles, as a matter of justice to the railroads and since they affect the efficiency of the railroads, because they are a factor in your business.

The fact is not disputed that railway building has not kept pace with other business in the last few years. One reason is that, compared with this other business, it has neither the same elasticity possible in expansion, nor the reverse. Caution is necessary, for money invested is invested permanently in property that can not be used for any other purpose. But the cardinal reason is the greater returns in other lines of investment, or greater promise of returns, during the last few years. Your

attention is directed to an article in the *North American Review* for November, showing the relative returns based on actual values, as near as they can be ascertained, from agricultural, manufacturing, and railroad investments. The figures used are from the Interstate Commerce Commission reports for 1900 and 1905, the special census for manufactures for 1905, the general census report for 1900, and the Yearbook of the Department of Agriculture for 1905. I do not wish to weary you here with the result shown; it is sufficient to say here that for each \$1,000 invested the net returns to capital for manufactures were \$151, agriculture \$98, and railroads \$44.

Now, the dollar that goes into the construction or reconstruction or equipment of a railroad is a privately owned dollar. It may freely go into any other form of industry—into a brick block, or a fruit orchard, or a cannery, or a farm, or a town lot, or what not. If you can not hold out reasonable assurance of the safety of that dollar and some return on it, the owner won't invest it in a railroad. During the last year there has been a great depreciation—billions of dollars—in railway securities, because the owners of the dollars invested therein either feared for their safety or thought they saw a better chance to make money through some other investment, and not only have railroads been affected, but also other great industries, copper, steel, coal and others finding their markets largely in railroads. It is not my purpose to go at length into the causes creating this belief. I have already quoted from statistics available to you all, showing that other investments have been better than railroads. Since the date of those figures there has been widespread legislation increasing the expenses and decreasing the rates of railroads. State legislatures alone have passed one hundred and seventy bills, more or less, adding to their burdens, and practically without economic investigation.

The other business of the country—manufacturing, agriculture, mining, lumbering, and so on—has flourished during these last few years as never before, proving beyond doubt that railway rates are not and have not been prohibitive nor a burdensome check upon commerce. In the face of this wonderful progress have come these legislative attacks upon railroads. You are to judge of the relations between the apprehensions of investors and such legislation. Fit the case to your own affairs. What have *you* considered good and safe investments during the last year or so? If fruit-growing and farming had been subject to price reductions in relation to their products by legislative attacks, such as the railroads have received, would not values of farms have been affected? And would not it be more and more difficult to get somebody's privately owned dollar into the business?

The U. S. Bureau of Labor Bulletin 69 of March, 1907, shows increases in wholesale prices since the decade ending 1900 of 24 per cent

for farm products, clothing 12 per cent, fuel and lumber 28 per cent—all commodities 15.9 per cent, which in the last two years has increased to probably 20 per cent. Wages paid by railroads have risen proportionately. Relatively, therefore, railroad rates would be about 20 per cent less than in 1895, even if the figures had not been changed. But the rates, passenger and freight, have decreased actually as well as relatively. Lately, notwithstanding that passenger trains are crowded, freight cars loaded heavily, locomotives carrying loads up to their capacity—conditions most favorable to maximum earnings—the increase in expenses and lower rates has been such as to reduce the net revenue to railroads, compared with last year, though the business carried has been the greatest ever known.

This, I think is of interest to you, because it is your problem as well as ours. To increase transportation facilities that will be needed to meet the growth of your business, somebody's privately owned dollar must be invested in railroads. And he won't invest it unless he has confidence that you and I and all the world are going to afford it the same protection as if invested in some other business.

It won't do to say that the general troubles of railroads are due to mismanagement. There is probably the same proportion of mismanagement as affects other important lines of business; for men, whatever their vocations, are not classified as to their honesty, ability, or energy by their lines of work, provided the work be honorable. But all the railroads have suffered—not one has been exempt. The record of security values will show that. The stockholders of railroads have not been turning things up side down; they have been satisfied quite generally with their managements. Men controlling and operating railroads are not different from other men.

This I would like to bring home to you as a matter of vital interest. The people of California have the lowest freight rates, distance considered, in the world to move their products to Eastern markets. Reductions that would wipe out absolutely net revenues to pay interest on that dollar I have referred to would mean an average reduction in the United States of less than 6 per cent in the freight and passenger charges paid to railroads to-day. That means little to you and far less to the average citizen. But the service the railroad gives you, dependent upon the investment of somebody's money, is of vital importance in your business, and you can afford to protect that investment to get the service.

We hear a good deal about water in railroad stock. How about Kansas land, now worth \$100, that was worth \$1.25 per acre until somebody built a railroad to it?—or the value of the village property until the railroad came and the village was transformed into a city?—or of a newspaper that grew with the city and that now has a value far beyond the cost of its type and presses? Gentlemen, everywhere, in every line

of business, men are hoping and striving for some return beyond the mere interest on capital involved—and if they don't manage capably its water will leak from any prospective value that is tied to the capital stock and it will show in the selling value. And sometimes, alas! more than the water runs away, never to return.

The public decides finally property rights and commercial privileges. They have decided to hold the railroads to a different standard—I think I may say a higher business standard—than any other business institution. Let me illustrate what I mean. Into the bread you eat enter many elements of cost, each affecting your pocketbook; the price of seed wheat, cost of plowing, sowing, cultivating, harvesting, of teaming to elevator, of elevator service, railroad freight charges, rolling in flour mill, sacking, perhaps advertising, and jobbers' and retailers' profits. All of these elements may vary according to quantity and individual notion, save the one item of railroad freight charges. The teamster hauling the grain to the elevator can make one rate if he hauls fifty tons, and a lesser one if given five hundred; likewise the elevator; likewise the mill may purchase at varying prices, according to quantity, and the cost of advertising will depend upon the space used, and the selling price to the jobber or retailer very likely according to quantity purchased. The only fixed element in the competition of this one sack of flour with another is the freight. The railroads have accepted the situation; it is to be equal rates to all, and with that policy no one can quarrel. But I would ask for the railroads of the United States, in relation to their rates for freights and fares, consideration and fair play—you are almost as much interested in their prosperity as their owners.'

The doctrine of free hate can not win. It will be a sorry country to live in when we all turn detectives and with dark lanterns lay for our fellowmen. I don't think we are badly off. I do believe that common honesty is as characteristic of our business life as at any time in the history of the world. The principal misunderstandings nowadays between corporations and the people are due to the lack of contact and therefore lack of understanding. It is impracticable for a shipper having need of a vast railroad machine to know all the officers and employés concerned in moving his freight, nor is it possible for these employés to know the individual shippers. And the human equation enters into these relations as much as in any other business. If an employé is ignorant or overworked or out of temper a new and undesirable "railroad policy" is established for the time being in the minds of the patrons. There are just about as many "railroad policies" as there are employés; but if you could look into the hearts of men I think you would find a quite general intention to head these policies in the right direction. The vast majority of railroad patrons come in contact with the agents and station men and conductors only; and these men have

troubles that I wish you could know of. It would broaden your charity for them. They must be business men knowing the business needs of patrons, rate men able to name rates to all parts of the country, telegraph operators familiar with train work, expert accountants making daily reports covering the great detail of station revenue, lawyers learned in interstate commerce law and versed in the statutes of the State ranging from a carrier's liability for baggage left on a platform to the law limiting the time live stock can remain in a car.

The men governing railroads are like other men—and if we could solve the problems of distance and have all these troubles discussed over a back fence as between neighbors, I think we would get along with very little misunderstanding.

This, on the whole, has been one of the most prosperous years in California, and the fruit-growers have largely shared in this prosperity, so far as the returns are in. Immigration from the East has reached high tide. We are getting more neighbors and, generally, good neighbors. All this means more rural facilities, mail routes, telephones, schools, churches, better wagon roads, steam and electric lines; all of the conveniences and additions that mean so much in rural life. The pressure of population has been increasing property values, too; and because of the great diversity in California products and the growing demand for them, I see no danger from any so-called overproduction, though of course we must expect lean years as well as fat ones.

The Southern Pacific Company and associated lines will continue to advertise California and California products throughout the world. In the past year we have circulated some two million pieces of advertising matter about California, sent to the East nearly five thousand wall pictures, furnished five thousand prints of photographs for Eastern publications to picture California, loaned to Eastern lecturers three thousand lantern slides, and sent over the face of the earth a million copies of *Sunset Magazine*. This work we will continue.

Since the fire the Southern Pacific has spent for equipment to care for California business \$16,650,000, and for track and terminal improvements nearly \$10,000,000. This speaks confidence in California as eloquently as may be.

There need be no hard times in California. If we have faith in one another, faith in the State's resources, cheerfulness and confidence in our business institutions big and little, all will be well. And there is nothing in the past of California that justifies anything but the greatest confidence in the future. Let us do without the calamity-makers.

In the absence of Mr. B. A. Woodford, the Secretary read his paper on "Marketing Citrus Fruits by the Growers," as follows:

MARKETING CITRUS FRUITS BY THE GROWERS.

By B. A. WOODFORD, OF LOS ANGELES.

The above method of placing in the markets the products of our citrus fruit orchards originated practically with the advent of the Exchange in 1893, so that in treating of this subject we must look largely to the operations of that organization during the last fifteen years, although various individual citrus fruit-growers and various associations of growers independent of the Exchange have, during the same period, with more or less success, handled their own marketing problems independent of any other marketing factor in California.

Oranges and lemons have been grown in California for nearly one hundred years, but until within the last thirty years the only variety of consequence was the Seedling, planted largely by or through the influence of the padres who were in charge of the early missions.

Beginning with 1874, the Washington Navel was introduced into California, and that variety now furnishes three-fourths of the entire orange shipments, the Valencia Late being second in volume of output, which variety is largely increasing and bids fair to finally become as large, in total output, as the Washington Navel itself. Lemons have only been produced in commercial quantities during the last twenty-five years.

Twenty-five years ago the annual total shipment of oranges was barely 30 carloads; fifteen years ago, 4,000 carloads; and during the last three seasons, approximately 30,000 carloads each year.

Difficulties in marketing arose when the volume of business began to increase largely, and reached an acute stage when the shipments were only 4,000 cars yearly, at which time the growers were absolutely at the mercy of the speculative buyers, or shippers, on commission, the producers themselves having no direct voice in the marketing of their product. In the season of 1892-3 these marketing difficulties became so serious that, in instances without number, not only did the grower receive no returns whatever for his fruit, but also, in addition to contributing his crop, was compelled to pay the freight and packing charges which the gross sale of his fruit did not cover.

Various methods of combination among the then existing shippers and among the growers themselves were tried, with a view especially to regulating shipments and distributing the fruit evenly in the various markets of the country, but these efforts were spasmodic, irregular and short-lived, and only partially successful.

In some sections, growers undertook to ship and market their own fruit and in a few instances the growers associated themselves together, marketing on a mutual basis. Owing to the failure of the combinations

among speculative shippers, and owing to the disasters that beset the growers in the marketing of their product individually, and encouraged largely by the experience of a few growers who had united in associations, a convention of the growers themselves was held in Los Angeles, on the 4th day of April, 1893, the purpose of the meeting being: "To provide for the marketing of all the citrus fruits at the least possible cost under uniform methods and in a manner to secure to each grower a certain marketing of his fruit and the full average price to be obtained in the market for the entire season."

Immediately following this convention, organizations of associations and district exchanges were effected in all the principal citrus fruit districts, the associations for packing, and the district exchanges for marketing, which was done at first through an executive committee composed of one member from each district. This plan was followed for two years, but on October 21, 1895, the Fruit Exchange was incorporated, since which date the marketing of all the fruit controlled by the various district exchanges and associations has been exclusively in the hands of the Southern California Fruit Exchange, or its successor, the California Fruit-Growers' Fruit Exchange, except during the period of seventeen months from April 1, 1903, to August 31, 1904, during which time the Exchange interests combined with various speculative and non-Exchange interests, under the name of the California Fruit Agency. The net results obtained during the agency were not satisfactory to the growers, and on September 1, 1904, the Exchange resumed the sale of the fruit it controlled independently of any other factor.

The Agency period proved conclusively that the interests of the growers themselves do not readily harmonize with speculative interests, and that in order to achieve the most complete success obtainable the growers must themselves handle their own marketing operations.

The principle of the Exchange lies in each member being entitled to furnish his pro rata share of the fruit for shipment to the various markets of the country, giving every grower the opportunity to ship his proportion of the fruit from day to day and week to week, and an opportunity to obtain his fair share of the average price of all markets during the year. All books and accounts are open to the inspection of each member, the whole basis of the Exchange being one of coöperation.

Growers near each other, who so elect, unite in packing their fruit, own their brands, and make such rules as they see fit for grading and conducting their business up to the time of shipment. Usually these organizations of growers own their packing-houses, although in some instances the packing-houses are rented. Every member is given a like privilege to pick fruit and every grower's fruit is separated into different grades according to the quality, weighed, and thereafter usually

goes into a common pool and takes its percentage of the returns according to the grade. Any given brand is the exclusive property of the association using it, and the fruit under this brand is always packed in the same locality, and therefore is of uniform quality. This is of great advantage in marketing, as the trade soon learns that the pack is reliable.

There are now eighty-six of these organizations of growers operating through the Exchange, covering every citrus fruit district in California and packing over two hundred reliable brands of oranges and lemons.

The District Exchanges are composed generally of several associations of growers operating in localities near each other, or in one locality, and the matter of shipping and marketing is controlled by the District Exchange, upon consultation with the associations and, through the associations, with the growers themselves.

The California Fruit-Growers' Exchange, or the general or central body, consists of one stockholder and director each, selected by the various local exchanges. The governing power of the central organization thus remains in the hands of the district exchanges. Thus from top to bottom the organization is planned and controlled absolutely by the fruit-growers and in the interest of all members. No corporation or individual, except the growers themselves, receives either dividends or private gain from the Exchange operations. The duties of the Central Exchange are found largely in the placing of the fruit in the various consuming markets.

While the Exchange has, through its operations in California, freed itself from speculative trading by taking its business out of the hands of the middlemen here, it has never opened retail or jobbing houses in the consuming markets, but has and does put the fruit in the hands of legitimate dealers for distribution, and to do this has established exclusive agencies in all the Eastern cities of the country, employing in these agencies active and capable men of experience in the fruit business, for the most part on a salary and having no further business of any kind to engage their attention. None of these Exchange representatives are permitted to handle any other than Exchange citrus fruits. These agents sell to smaller cities adjoining their headquarters, and over all are two general or traveling agents, with authority to supervise and check up its various offices, the headquarters of these two general agents being Chicago and Omaha respectively, where complete information is kept of all the business transactions of the Exchange in all markets. This information is gathered from day to day and distributed by these general agents among all markets, thus making it impossible for a customer to take advantage of any Exchange representative in any market, and, knowing the consumptive needs, and the price being

obtained in all markets, a proper distribution of fruit is effected, thus preventing an over-supply in one section of the country while a shortage might exist in another.

Approximately 35 to 40 per cent of all the fruit shipped by the Exchange is sold at public auction at point of consumption, the remainder being sold at private sale.

The Exchange has the most complete system of gathering trustworthy information regarding supplies, market conditions, etc., of any factor engaged in the citrus fruit business, and, owing to the volume of its business, the Exchange can furnish this information at a much less cost to its growers than any other selling agency.

During the history of the Exchange, the output of the State has increased from 4,000 to 30,000 carloads yearly, and the shipments by the Exchange have increased from less than 2,000 to above 16,000 cars yearly, and in percentage of the whole crop from 25 per cent in the earlier years to 55 per cent during the season just closed, clearly showing the popularity of the Exchange with the growers.

In 1893, when labor and material were much cheaper than now, the charge by the speculative or commission shippers for packing each box of oranges was 40 to 50 cents, to which they added a charge for selling of from 7 to 10 per cent on the delivered price, making the total cost to the grower for packing and marketing from 60 to 75 cents per box, as against an average cost of about 35 cents per box for both packing and marketing during recent years to Exchange members. Other growers, as well as Exchange growers, have benefited through the Exchange's handling its business at actual cost, in that speculative shippers must charge about the Exchange cost if they expect to get fruit from the growers.

During the last three seasons since the Exchange resumed its own marketing operations after the downfall of the Agency, it has shipped a little more than 43,000 cars of oranges and lemons, and has distributed among its growers therefor a little over \$28,000,000, with a loss on account of failure to collect and in transmission of funds of only \$310, this amount being only part of the returns on one shipment of the 43,000, a record that will hardly be surpassed in the years to come by any business organization.

In addition to packing and marketing the fruit of its growers, the Exchange has always taken a keen interest in transportation and tariff matters. The cent-a-pound duty on imported citrus fruits was obtained largely by the Exchange membership, through a committee composed almost exclusively of Exchange people, and the somewhat reduced icing charges, the reduction of the freight rate on lemons, as well as a smaller reduction in the orange freight rate, were brought about either by the Exchange alone, or with the assistance of other growers not

Exchange members, through the Citrus Protective League, these transportation savings amounting to \$1,000,000 yearly.

The Exchange is not a trust in any sense. It does not seek to control production or arbitrarily to fix prices. It does undertake, so far as possible, by coöperation, to displace the competition of one grower with another in the matter of packing and marketing their fruit by purely economical as distinct from trust methods. It insures to every grower the full reward of growing good fruit and to every association the benefit of good grading and packing.

Through the operations of the growers in packing and marketing their oranges and lemons, as outlined above, the industry has greatly prospered and has assumed immense proportions. While it is not claimed that all the difficulties of an orange or lemon grower can be avoided by becoming a member of the Exchange, and while difficulties will from time to time surely beset the citrus fruit business, just as is the case in iron and steel, hogs and cattle, corn and wheat, and all other lines of business, still the growers of citrus fruits will undoubtedly find in the future, as they have in the past years, that by standing with each other in these packing, marketing, and other matters that are of common interest to all, the difficulties that have to be met from time to time will be reduced to a minimum and the greatest net amount obtainable for their products will be received.

The citrus-fruit growers in California who market their products through the California Fruit-Growers' Exchange have an enormous volume of business, large enough to maintain their selling organization in every part of the world at a reasonable rate of expense. There are great possibilities, however, for an enlargement of the coöperative marketing plan as now practiced by the Exchange to the benefit of other California producers. During the last two seasons many applications have come to the Exchange from growers and organizations of growers who produce celery, cantaloupes, and other fruits of the soil, urging that the marketing of their commodities be included with citrus fruits. All such applications have been refused, with the single exception of a considerable portion of the deciduous fruits of California.

The benefits to be derived from an enlargement of the Exchange marketing plan so as to cover other products of the State would not only be in obtaining these marketing services at actual cost by the growers of such products, but undeveloped markets, not only in this country, but throughout the world, could be more vigorously exploited than is now the case, when all these producing interests act independently of each other. Offices in all the principal cities of Europe, in the Orient, in Australia, and in other parts of the world, under competent local management, advertising and pushing the sale of California products only, would surely result in an increased demand and increased prices for the products of the State.

THE CHAIRMAN. We will now listen to Mr. F. W. Crandall's paper, "The Great Canadian Northwest as a Market for Fruit."

MR. CRANDALL. Mr. President, Ladies and Gentlemen: I will preface my paper by a word or two in which I hope to explain somewhat my position. I have been making quite an extended trip in the Dominion of Canada, during which time I have seen developing and developed a sort of a mad rush on the part of people to that section, and it has been somewhat of a study with me to learn the reasons, the objects, or the advantages of this movement northward, and in order to do so I have traveled over the country considerably and studied the conditions and will try in a brief way to give you some of the ideas that have come to me.

You will note that in my paper I will not deal at all with statistics. They are dry enough when you haven't anything else to do, and they are certainly too dry for a fruit-growers' convention; but I will try to give you some facts just as they come to me, not in a labored way. I hope those of you who are interested in the apple question will examine carefully this fruit on the table and take it away with you. I picked this fruit from the trees just a few days ago. It seems perfectly contradictory to pick from the trees apples which are perfect in development and preservation when within a few hundred yards there is snow which has been on the ground for a month or six weeks and the ground is frozen hard enough to walk upon or ice to skate upon, and there are so many of those conditions that it seems peculiarly interesting to take up this subject.

THE GREAT CANADIAN NORTHWEST AS A FUTURE MARKET FOR CALIFORNIA FRUITS.

BY F. W. CRANDALL, OF SAN JOSÉ.

I had the honor of reading a paper at your convention four years ago on the subject of the "Fruit Markets at Home and Abroad." Just previous to that convention I had returned from an extended trip through the Eastern States and Europe, the principal object having been to exploit the markets on the other side of the Atlantic, and to learn the methods which must be employed in order to meet the requirements of that trade. The discussion and interest elicited from my paper was so general that it seemed to me a similar paper, treating on the conditions just across the northern border of our country, which is at present coming to the front as a fruit consumer more rapidly than any other section on earth, might prove of equal interest; hence I gladly give you the results of observations during the past four months, covering not only the grain-producing sections of Saskatchewan, Alberta, and British Col-

umbia, but also the new fruit country, which is being discussed so much, which embraces the territory adjacent to Kootenay, Arrow and Okanagan lake regions, in southern British Columbia.

The motto "See America First" has been taken up with much vigor by many organizations in the United States, and it has developed the fact that one can find as grand scenery and as beautiful mountains, right in our own country, as can be found at the end of long and expensive trips abroad.

I doubt not that similar results may be realized as to our future market for both fresh and cured fruit, if properly exploited, right in our near neighbor Canada, and such exploitation would cost less, and the results be vastly greater, than could be attained by such countries across the water, as France or Germany, which in years of plenty have little need for our fruit productions, while Canada will always be a good customer. It is not when crops are so short as they have been the present year that new markets appeal to fruit men, although even this season the prices were so much higher than in former years that it had the effect to curtail sales as to volume very much.

The rapid settlement of any new territory near us, especially where fruit can not be grown to any great extent, seems to me has a special interest, and we must be alert to gain every advantage possible from such conditions.

This paper will deal more particularly with what is known as the "Canadian Northwest," and while east of the province of Saskatchewan takes at the present time much more of our California fruits than the three provinces mentioned, I shall not include them in my investigation.

We have been prone to look upon this great Northwest Territory as vast stretches of mountain and prairie land, valuable in the most part for hunting and trapping, and of late used to some extent for grazing, not considering it seriously as a great agricultural section, which it really is; in fact, I had very much the same idea, until in quest of better health I made the trip up there, spending upwards of four months, and found I was mistaken. The area embraced by these provinces is nearly 700 miles from north to south, and 1,100 miles from east to west, or an area of nearly 770,000 square miles, and it is safe to say that one half of this vast area is suited to agricultural uses and will rapidly come under cultivation, while the other one half includes mountains and lakes.

Think of an area of two and a half times as large as the State of California, fertile soil, level or undulating and well watered, and what this will mean when it is settled, as it will be, at no distant day, with a family on an average to 160 acres. But you say, it is so far north, what can you grow? True, it is north and far north, at that; but, even so, climatic conditions seem most contradictory. At more than 700 miles

north of the 49th parallel, which forms the northern boundary of the United States, wheat and other cereals are grown abundantly, as well as most of the common vegetables, and as soon as transportation facilities are provided these more northern sections will become great grain-producing countries, no doubt exceeding an average production to the Dakotas or Minnesota, and few, if any, failures.

Much of these lands still belong to the Canadian government and are open to settlement on favorable terms, while other large tracts are under railroad control, having been granted as subsidies to induce and assist in building roads into these localities.

The Canadian government is doing everything possible to bring settlers into this country, while at the present time two lines of railway are heading toward the Peace River country, and no doubt will extend their lines through Yukon, to Alaska. Edmonton is the most northerly railroad point on the continent, a modern city of 12,000 population, and is at the present time the terminus of three railroads, C. P. R., G. T. P., and C. N. R., two of which are pushing their lines through to the coast, thus opening up to settlement rich and promising sections, and paving the way for a rapid settlement of the great Northwest.

So great has been the movement that during the past year or so nearly all the great American magazines have had more or less to say concerning the development of this country, staff writers having spent much time there, and large numbers of people are being drawn from the United States. The tide of immigration is by no means letting up, and it is safe to say that from the United States alone 150,000 to 200,000 people have crossed the border to invest in Canada cheap lands during the past twelve months. Don't think for a moment that these are a lot of "ne'er-do-wells" or "shiftless" people who are going over. Far from it. I personally have met hundreds of them in Alberta, and will say that a more enterprising and intelligent class of farmers would be hard to find, and the greater portion of them have considerable means, too. If this may be taken as an earnest of what may be expected to continue during the next few years, the United States will certainly be justified in making a rigid inquiry to offset, if possible, this great drainage from our progressive population.

The cheapness of land has always been, and always will be, an inducement, and while climatic and other conditions are also favorable to go with it, it makes it doubly attractive as a matter of investment. Canada land companies are alert as to this feature, and are not leaving a stone unturned to present their claim in the most attractive way possible; but I must say, with the exception of a few unreliable concerns, the actual conditions one meets are such that it is not possible to offset, by sound argument, these statements which are circulated freely all over

the country, especially among the agricultural states of the Middle West.

The United States is not by any means alone in furnishing settlers, for the various European countries are sending large numbers, in some instances entire colonies being made up of Germans, Poles, Hollanders, and other nationalities, in this method helping to establish helpful and social advantages. Japan, not to be outdone by other nations, is also looking to the settlement of a large number of her subjects in these provinces, unless the Government prohibits such a move.

The Canadian Pacific Railroad is spending nearly \$5,000,000 in the construction of the largest irrigation project on the American continent, putting under ditch nearly 3,000,000 acres of level land near Calgary, in Alberta, these lands having come to them as a subsidy from the Government. Even now the work is well advanced, and next season perhaps 500,000 acres will be under water. Sugar beets, alfalfa, and grain will be grown on these lands, but fruit seems to me to be out of the question.

No matter how great may be the developments in other directions, they must look for most of their fruit requirements from other sources than Canada, and of all this great territory there is only a very limited area in southern British Columbia where fruits can be successfully grown.

So much has been said of the progress and future possibilities of fruit-growing embraced by the Kootenay, Arrow and Okanogan lake regions, that a few weeks ago I decided to take a trip through these sections and study the conditions carefully, and I am just now returning from this trip.

I met two distinct surprises: one is the large number of varieties of fruit, as well as the quality of fruits, produced in these sections; the other being the extremely limited area which is adapted, or can be used, for the culture of fruits of any kind. Nature has seen fit to give these sections a climate which so differs from the country roundabout that it is almost beyond belief. Surrounded on all sides by snow-capped mountains, so rugged as to preclude any attempt to cultivate in any way, these small tracts along the lakes and up the mountain streams seem quite out of place in having a mild and temperate climate. But little snow remains on the ground more than a few days at a time. The principal lands which are now devoted to the culture of fruits, or in fact ever can be, in these sections, owing to the mountainous and climatic conditions, changing within short distances, are the narrow parcels of partially level land which lie between the lake shores and the sharp incline of the mountains. Some of these parcels are but a few hundred feet in width, and extend in long, narrow strips parallel to the shores of the lake, while others lie along the course of

the streams and may extend for several miles from the lakes into the mountain cañons.

The greatest areas which are available for fruit purposes lie along the Okanogan Lake, on both shores, east and west, and it is probable that in the aggregate from 25,000 to 35,000 acres may be planted. These lands are now mostly in the hands of speculators and are held at from \$75 to \$200 per acre and will average probably about \$125. The terms on which they are sold bring the payments due in two or three years, which is before anything can be realized from fruits grown on the lands.

The cost of the land is by no means all the expense, as in many instances it requires as great an outlay to remove the stumps and prepare the land for fruit as the original purchase price of the land. Then, in addition, there is the long, weary wait for trees to grow. This is softened somewhat by the raising of berries, or some other product, between the trees while they are too young to bear, and thus far it has been very profitable.

The orchards through this section, though young, are great producers, the principal tree fruits being apples, pears, plums, some peaches, cherries, and crabapples. So late as the 25th of November I picked apples from the trees at Creston, and while the mountains surrounding were covered with snow down to within a few hundred yards of the orchard, still the fruit was unharmed.

The statistics as to the fabulous quantity which some of the orchards turned off would sound like a reproduction of the "Arabian Nights." From the very best authority I was told that as much as \$1,800 was realized from single acres of orchards in a single season, and these statements were verified by sworn affidavits. While I in nowise discredit the foregoing statement as to the amount realized from a single acre, still at the same time I would not advise any of our California fruit-growers to sacrifice their orchards at bargain prices to go into this section for the purpose of fruit-growing; not that fruit growing under intelligent conditions would not be profitable, but the general lay of the country is such that one will not be surrounded with unique social conditions, which we enjoy to so great an extent in our orchard sections of California.

The scenery is magnificent—grand. Trips about the lakes are extremely interesting and healthful, and it is a fact that the means of transportation and communication already furnished are all that can be asked or expected for such a rough, mountainous country and one so new and sparsely settled.

There is no doubt, also, that the marketing facilities for the fruits grown are the best, and will *continue* to be good, for within a day the products can be landed in most of the larger cities in Alberta and British Columbia.

Granting all that can be said, or may be said, it still remains that for canned fruits, as well as for cured fruits, this great territory must look to other than within its borders for supplies; and while Washington and Oregon will get their full share of this trade, it is from California that most of the fruit supplies must come, and with a population which at a conservative figure can not be placed at less than ten millions of people at no distant date, it seems most reasonable to expect a great future market from that direction.

I believe the conditions are such as to justify us in making a very careful canvass of the situation, thus placing ourselves in a position, not only to obtain, but to hold, this great country as our own market, and with the present favor which our California fruits receive, and by employing honest methods in packing, which should at all times obtain, we have great advantages over any other source of supply.

It behooves us to treat with the Canadian government for more favorable duty charges, which, owing to the fact that most of our fruit products do not compete with any like products of their home growing, I believe could be secured with very little trouble, and while I am not prepared to say that we will ever be able to compete, in the markets of the world, against the wheat, oats, barley, and live stock which will pour out of this vast region, I do not look upon the possibility of a sufficient area of fruits of any varieties to be developed in western Canada to, in any great extent, affect our marketing from California vast quantities of our fruits, both fresh and cured, and it seems to me no time should be lost in working out a system for securing this business.

THE CHAIRMAN. There are a few minutes yet that can be utilized as you see fit.

MR. MILLS. There is a man among us who has been very greatly interested in the farmer and his work. He has done more than any other man, I believe, in this State to advance our interests. Judge Shields of Sacramento is here, and I am sure you will be glad to hear from him.

THE CHAIRMAN. We will be glad to hear from Judge Shields.

ADDRESS BY JUDGE PETER J. SHIELDS, OF SACRAMENTO.

Mr. Chairman, Ladies and Gentlemen: I am completely taken by surprise at this very substantial honor and in presence of the breadth and variety of the discourses which have been presented. I am reminded of the incident of a peculiar old character we had down in Sacramento who was asked to address a body, and when asked upon what subject he would speak said he would leave it to the chairman. After thinking it over awhile the chairman announced that he was going to talk on the

history of the world. It occurs to me that if I review the suggestions which the papers this afternoon have presented to us my subject would be almost as broad as that of old Jim. One thing that I do want to say, and that may be of some value in crystallizing an idea that has already been advanced by Mr. Mills, is that we would gain a great deal more in these meetings if we had fewer papers and discussed fewer subjects and threshed out those subjects more completely until we exhausted their possibilities. There were a great many things said to-day that were very valuable. There have been a great many ideas advanced which go to the moral order and safety of society, and I think we would have had much more benefit if we had discussed those things at length.

I was reminded, as I heard the different speakers read their papers, of what different views we took of life and of what different conceptions we had of our various duties to society. Take, for example, our friend Mr. Judd, who read to us such a vigorous and thoughtful paper a short time ago. We gained the idea from that paper that if our tax system were equalized, if our system of raising revenue were placed on a just and safe basis, most of the ills which afflict us would be eradicated. It would have been a very fruitful subject for discussion if we had followed out that thing and sifted some of the chaff from the wheat which that article contained.

It may not be unprofitable for me to give my views on two or three things which have been brought before us, and though they are hasty and crude, yet they are in the nature of discussion. I do not thoroughly agree with Mr. Judd, for example, that the manner of unequal taxation upon the farmer has been responsible for all the consequences which he so seriously and thoroughly outlined. I think that one of the things which has cursed the growth of America has been the idea of haste. We wanted to do it all in a day, and I think that the inequalities in our taxation and the prostration of some of our agricultural interests and the abandonment of some of our agricultural territory have been due to that more than to the causes somewhat emphasized in that paper. We have been building civilizations based upon cities; we have been trying to build up commerce; we have been trying to get the balance of trade on the right side. We have been doing things for to-day instead of for the future. We have entered into a new country and built it up; we have built "Lusitanias" which will bring any quantity of people every two or three days and land them here. We have been living off the richness and the fatness of the land and have been skimming it off, and so we have gone out and we have plowed with steam plows and we have harvested with combined harvesters and we have slashed forests and burned millions of feet of lumber where it was in our way. That is one of the reasons why the cities have grown disproportionately large. We have not done anything to build up our agricultural industry; we

have not done anything to make agriculture live, prosperous; we have not done anything to lift it, to make it attractive, to refine it.

Another reason why our farms have been abandoned—and I confess the showing made with respect to the abandonment of farms in Eastern States is really gloomy, but I think a little reflection will tell us some of the reasons for it—is that we have not got enough people to cover our land. The people settled in the East and skimmed off the richness and then they moved to another farm, and they have come clear West that way, taking new land and skimming off the richness. I do not doubt that there is considerable inequality in the taxation of farms and it is a good subject to bring before this Convention, but I do not think it has been responsible for everything stated in that paper.

I was deeply interested this morning in the address of Colonel Irish. There was a vote taken in which there was one man against Colonel Irish. It might be the part of discretion for me to join the multitude. There is a good deal to be said on both sides of that question, and it might not be unprofitable for me to suggest a few of those things. It does occur to me that it is a dangerous thing to introduce into this country an element which is menial and dependent and servile and expect to build up the country on it. There is no doubt that, right at this time, we do need that kind of labor. There is no doubt that is one of the penalties we are paying for importing them, but if you look at any community where that thing has been done for any considerable time, there have been a train of evils which have followed it which are pitiable and which will be atoned for in blood and in sorrow and in the degradation of the people. How easy it was for the Southern States to say: "We have rich land here; we can grow wonderful crops if we have cheap labor; we must have this class of men to do our farming for us"; and so they brought the negro in because it was a good thing for the short sight. Well, what a debt it has entailed upon us and what an infinite price we have paid; and if there was such a thing, what a much more infinite price we would pay to sweep it out!

I remember what was said about the immigration from southern Europe. It was brought in to meet the demand; it was brought in to exploit the richness of the country. One thought occurred to me, that Colonel Irish was rather over-drawing the picture. In the first place, a great many of the men whom they bring over from that country—and they are brought over although the contract labor law is to the contrary—are mature men; they are unmarried men. Great numbers of them go home; great numbers of them never marry and they raise no children. Some of them are past middle life. There are very few of those people who come here and permanently settle down and who marry and add a quality to our society which we have to absorb into

our social and into our industrial life. That can be seen to be a little bit out of proportion.

I knew a section of California that was very rich, where a great many Chinese were brought in—and I speak without feeling and without demagogism, because on the farm where I grew up we employed many Chinese. They were very affectionate and I recall, among my childhood memories, many tender recollections of that class of people; but they are distinctly inferior; they do the smaller things and they do the humble things. I knew, as I said, one section of this State where those men came in in great quantities, and the result was the boys and girls of that country lived an easy life. They were not trained industrially. They had high-minded notions of their quality and their class, and I look back in sorrow to think of the grand old families that raised up worthless and no-account sons and daughters. Now, we are in an emergency. We brought those people in here as we would bring a lame man who has a crutch, and afterwards you can not throw them off in a moment. But when we are discussing a policy that we should enter on permanently, over a long period, we must think of our relations to this world. Now, a man is born here and is confronted with two serious considerations. The first purpose, probably, of a man's life is the pursuit of happiness, but he must not lose sight of the fact that others are to come after him; and no act is performed wisely and justly and with perfect honesty that is not done in light of the fact that you are a trustee of the future; and so, in considering whether or not we should enter upon the introduction of a very large element that we can not assimilate, I think we should think considerably about it. I would rather see this country built upon the basis of being the model community of the world than to see it the richest community. I would rather see it built upon a basis of quality than of quantity. I look back with a whole lot of regret to my boyhood and find how it has been modified in many cases; how it has been degraded by the course we have entered upon. The only success that was pictured to us was that of making money, and quantity in all instances was required and demanded in that case. A man had to build a railroad, he had to erect a sawmill, he had to construct a line of steamships; we had to get the balance of trade right; we had to get an enlarged standing relation to the nations of the earth; and the result was that we demanded speed and we enforced speed, and we didn't put any condition upon it, and now we have in this country a powerfully, infinitely lofty structure of commercial enterprise, and we are commencing to realize that we did not build it soundly and we are experiencing the first shocks of a moral earthquake that is just as sure to shake us down to decent levels as the sun is to shine to-morrow; and I would like to have that idea dominant in every one of our laws, the idea that we are going to live to-morrow as well as to-day, and that whatever we do

in adopting policies for social growth or for the construction of states, it is well to take the larger view of it.

There was another subject that was spoken of this morning by Mr. Mills, and I want to agree with him in that, and as long as Colonel Irish is not here I can go after him without hesitation. In the condemnation which he visited upon the heads of our laboring people of California, I was profoundly impressed with the moderation and the propriety of the language of Mr. Mills. In the methods we have adopted to get there, no matter how, we have brought up this society of men. After all, we are very proud of what we are, and we are very liable to look down on the other man and condemn him for what he is not; but to a greater degree than we think, we are the creatures of circumstances with which we have been surrounded, and while a man may to some extent select his path, there are a great many conditions which surround us over which we have no control. This civilization of which we are members and of which we are factors has been responsible for making that man what he is. We have given him a bed, and I have seen it so often on the side of a straw stack. I have seen him come in after a hard day's work, with his garments wet and soaked, and he has been turned into a cold loft. We have denied him social recognition; we have denied him education; we have forced him out of this and out of that and he has got to find a back room some place, and that back room has been the saloon. He has gone into the saloon and found a bright light and some chums who will recognize him, and then after we have pushed him in there and made it impossible for him to go anywhere else, we damn him because he goes there. Now, I just simply say that on the side, and in justice to a class of men of whom I am afraid we have not been sufficiently considerate and a class of men to whom we have been unjust.

There was another subject brought up this morning that I did want to talk about, and that is the subject which lies so close to Professor Wickson and myself, and if it had not been so very near 12 o'clock I would have liked to answer Mr. Berwick just a little bit—and Mr. Berwick, by the way, is a good deal like Colonel Irish—but I am so sure I am right in this matter that I am not even afraid of Mr. Berwick. We don't want to have the State Farm a self-supporting institution any more than our public school system, and that is all outgo and no income. But, as I said before, we want to take a longer look ahead, we want to take the broad view. I will tell you how it is self-supporting, just in the roughest sort of way. I recall that at one of the experiment stations in Minnesota a professor developed a wheat that is worth ten or twelve million dollars a year. That professor was getting probably \$2,500 and the whole expense was probably \$25,000 or \$30,000, and in return for that he gives you \$10,000,000. I believe the corn crop of Illinois has been estimated by the corn-growers' association to have increased from ten to

thirty million dollars. The same thing has been done in Iowa. What could it do for us out here? Think of all the things we have that can be improved, and of the millions of dollars that can be added to the dairy product by improving the character of the cows; think of the added value by improving the character of the poultry, by improving the orchard by teaching you a little bit more about the varieties to plant. The possibilities of it are perfectly dazzling.

And then there is another way that this institution pays its way, and that is that it has a tendency to solve all the problems that have been raised here to-day. It will stop this abandoned farm proposition; it will help equalize taxation; it will solve the labor problem; it will keep the boys and girls in the country and strengthen society on that side rather than on the side on which danger lies. The boys who attend the Davisville school will become enthusiasts. They will be happy themselves and they will draw others into the circle they occupy, and how the State will be enriched as a result! We will have less crime, less pauperism, less insanity, less reform schools. We will have a higher standard of moral life. We will solve the divorce question, because whoever heard of divorce among country-dwelling, farm-loving people? We will have more school houses and we will obey our strenuous and wise President in filling them, and in a thousand ways the Davisville school is going to pay its way. It is going to pay it in fitness of its students for citizenship, in morals, and in patriotism. I listened with much interest to Professor Anderson and wished he had put much more fire and emphasis in what he said. I am like Mr. Judd, and think I have a solution of all the ills to which we are heir. I believe it is to have more farmers, better farmers, and then we will have better politics and less taxes and the whole life will be elevated.

Professor Anderson made a plea that the people would meet the Legislature half way. I want to speak for the people and say that we want the college to meet the people half way. I have been before the Legislature, a beggar for my pet theory, and I have found nothing but an extended hand and an open heart and a disposition to give for the growth and the promotion and the extension of agricultural education, as it is expressed and outlined in the Davisville idea, all money that is needed, and wherever I go among bodies of this kind and meet people of this type I find an equal disposition to send their sons there just as fast as the place is organized to receive them. And so I say to Professor Anderson, that if he will go ahead and equip that institution, our boys and girls will go there in flocks and the Legislature will pay all the money that is necessary to keep them there, and then we will have a better California and will have less of the evils that torment us to-day, and will have less of the evils that will torment us hereafter. (Great applause.)

MR. BERWICK. It is rather a dim, religious light to talk in, but I would like to say a word or two. In the first place, I don't think that the average working hand is the light-hearted man he has been pictured to be. I have not forgotten my own experience. My men that I have employed have not been at all ill-used. I am also running a school myself on the basis of making it pay. I have been successful in doing it. It has been my family school. We have made the farm pay in a small way. I still think that if, as an object lesson, we could make that State Farm pay it would be an exceedingly good thing for the students who will go there.

An adjournment was here taken until to-morrow at 9:30 o'clock A. M.

PROCEEDINGS OF THIRD DAY.

THURSDAY, December 5, 1907.

The Convention was called to order by Chairman Jeffrey at 9:30 o'clock A. M.

THE CHAIRMAN. Members of the Convention, there has been a request from some one in the audience that Mr. Crandall have five minutes for the purpose of explaining the maps he has here. If there is no objection, Mr. Crandall may take five minutes.

MR. CRANDALL. Yesterday, at the close of the few remarks that I made in my paper I expected to point to the maps that I have here, showing you something of the location, as I promised you in the paper. Judge Shields' remarks cut that out. The lands which are being offered at present for settlement—I am speaking particularly of orchard and fruit purposes—lie along the Kootenay and Columbia rivers and the extension of these rivers which form the Arrow, the Kootenay, and the Okanogan lakes. This is simply a widening of the Columbia River and the Kootenay River. These are the only lands suited to orchard purposes. Looking here, there seem to be quite wide scopes of land, but let me explain. In California there is much land being offered near by on the merits of what other lands produce. Upon examination you will find that the character of the lands is entirely different from the lands producing these great crops. The same may be said of much of these lands which are being offered along these rivers and along these lake shores. They are being offered on the strength of the quality of the other lands, but are in nowise of an equal character or producing possibility; therefore, if any of you have a bug in your bonnet and think you want to go into that country, don't, for Heaven's sake, buy land on paper. Go there, and you will find that more than one half the land which is being offered at these fabulous prices is nothing more than almost upright portions of land, made up very largely of rocks, with a very great absence of soil. So much for that.

Now, there are several questions that some of our friends wanted to ask. One was in regard to the quality of the fruit there. I can say that, so far as strawberries and other berries are concerned, they are excellent, the quality is fine. A dish of berries which are picked and brought down from those orchards and set on your table will fill the room with a delightful aroma. The apples, although they look well, are

in many instances fibrous and coarse, have a sort of wild flavor, and are not pleasant to eat, as are our Oregon apples.

THE CHAIRMAN. The point, Mr. Crandall, is, none of us want to leave California. We want to know how we are going to supply that market, what kind of fruits they will need, and how are we going to reach it.

MR. CRANDALL. That question, I think, was brought out in the paper I read yesterday when I referred to canned and dried fruits.

THE CHAIRMAN. How about the green fruits?

MR. CRANDALL. I am very much of the opinion that, aside from oranges, lemons, and prunes, the green fruits will be supplied from the Oregon and Washington sections, and also the fruits that they grow in these territories. Oranges and grapes are now and will be in great demand. I ate California grapes in Edmonton that were grown above Los Gatos, and our oranges, raisins, and nuts are on the menus everywhere; nearly all are supplied from California.

MR. BERWICK. Isn't there a large and growing demand for early fruits in Victoria and Vancouver?

MR. CRANDALL. There certainly is, and I am sorry to say that many of the berries and fruits from the Okanogan and Kootenay countries reach those places almost as soon as our California fruits. The reason for their ripening so quickly is the exceedingly long days they have in that country. I have read the newspaper in the morning at between two and three o'clock without artificial light and I have read a letter from my wife at a quarter-past ten at night without artificial light. It is those very long days that force, within a very short period, the development and ripening of fruit.

For the balance of the morning session Mr. H. P. Stabler acted as Secretary pro tem., in the absence of Mr. Isaac.

MR. KING. Mr. Chairman, will there be an opportunity for those going on the excursion to get into the orchards and see what they are doing with the white fly?

THE CHAIRMAN. There will be an opportunity, but while the fly is in its dormant state there may be some scattering.

MR. KING. There are several of us after information, and if one may go in and see practical demonstration of what is being done it would be better than what we can get out of print or from some one's explanation.

THE CHAIRMAN. The order for disinfecting those trees makes provision for the work to begin on December 15th, so no work is actually being done. The Commission thought that by the 15th of December the flies would all be attached to the leaves and there would be no danger

of carrying infection and that it was best not to begin until the 15th. So there is no work being done, although Mr. Carnes, Mr. Maskew, Mr. Whitney, and the County Commissioner there, have got a plan all outlined. They have inspected all of these 999 lots; they have got a map drawn showing the boundaries of the detected part, which is very small. That is all to be defoliated and all the other 20,000 trees in Oroville are to be fumigated; so we have worked out a thorough system of checking every tree. Every tree in the 20,000 will have a number attached to it by a tag. If you go to Oroville you will find our little office there and at that office you will find samples of all the white flies in the section. I think there are anywhere from five to twenty different species there, all mounted. I will say with regard to the Marysville fly, that after an examination by our best experts they are able to find the fly on only four trees, which have been destroyed, so practically it seems that the fly has been exterminated here, though we can not say for sure. Now I will ask Mr. Stabler to read Mr. Kellogg's paper.

The Secretary pro tem. then read the paper of Prof. Vernon L. Kellogg.

SOMETHING WE NEED.

BY PROF. VERNON L. KELLOGG, OF STANFORD UNIVERSITY.

Two years ago I had the privilege and pleasure of reading a short paper to the Fruit-Growers' Convention on the subject of the relation of pure science or scientific investigation to the interests of the California orchard men. In that paper I tried to point out the final dependence, in the long run, of successful horticulture on scientific investigation, and suggested the importance of a recognition on our part of this fact, and pointed out in general terms the advantage we might gain by acting on the basis of this recognition.

In this brief paper I wish to show that horticulturists elsewhere have recognized the value of scientific studies and have acted to their own advantage on the basis of this recognition. And I wish to indicate, in specific terms, how we, too, may act advantageously on this basis.

California's annual horticultural product is worth approximately seventy-five million dollars. Its farm product is worth about as much more. Each year injurious insects lessen the possible fruit product by a variable fraction: one fifth is the general estimate made by economic entomologists for the country at large. California insects will surely not allow their figure to be lower than the average. She spends, this State of California, practically no dollars a year for definitely directed, specific, competent, original investigation of the life history and habits of these ever-present, active enemies of her fruits.

New Jersey's annual fruit product is worth something less than a

tenth of California's. She supports an actively investigating State Entomologist at a cost of about \$7,500 a year. To be sure, this entomologist has to study mosquitoes and field crops and dairy pests as well as fruit pests.

Nebraska's horticultural and agricultural annual product is about equal to California's fruit product alone. She supports an investigating State Entomologist's office at an expense of \$4,000 a year.

Minnesota's annual total agricultural product is worth \$150,000,000 a year, perhaps twice the value of California's fruits. She expends something more than \$10,000 a year for investigating insect pests.

The State of New York supports an investigating State Entomologist's staff at an expense of approximately \$10,000 a year; and the entomological work of the two experiment stations at Geneva and Cornell costs \$10,000 a year more. All this is over and above the \$25,000 a year expended for nursery and orchard inspection work and quarantining.

I could tell you of other states. It would be tiresome. The point is, other states have recognized the worth-whileness of having thorough scientific study of their insect pests that they may fight them effectively. California does not do this. We pay out several thousands a year for quarantine work. We pay practically nothing for thorough, original investigation of the characteristics and ways of our enemies, that we may learn of our vulnerable points and direct our practical efforts against them successfully.

Some questions may be asked. Are our pests in California all different from the ones in other states? If not, why not take advantage of the investigations of other states and thus get our knowledge for nothing. Answer: Many of the California pests are different from those of the Middle West and East. Those that are not have different habits and seasons and ways, as indeed a moment's reflection on our radically different seasonal and general climatic conditions will suggest to any of us.

Another question. What is the money used for that is appropriated to the insect-pest side of the Horticultural Commissioner's work? Answer: Almost exclusively for quarantining, inspection and importation and rearing of beneficial insects. Not for discovering new facts, not for long, thorough, scientific investigation of our pests. There isn't money for both sides of the work, and quarantining, absolutely imperative, uses it up.

Still another question. What about the entomological department of the State University? Answer: Primarily it is of necessity a teaching department; the entomologist and his staff must first teach to large classes of more or less uninterested freshmen and sophomores the rudiments of entomology. Then must go time and energy to the compiling

of bulletins and the answering of a host of questioning letters like the classic one received by Director Roberts at Cornell several years ago, "My ducks are dying. What shall I do?" Finally what time and strength are left may go to long, thorough scientific investigation. Well, what time and strength *are* left, do you think?

What we need in this State is an adequately supported staff, or bureau, or office, wholly out of politics, not necessarily connected with either the Horticultural Commissioner's office or the State Experiment Station—but not necessarily *not* connected with them—for the intelligent, persistent, thorough, original investigation of California pests and the conditions under which they work. Such a bureau or staff could be supported for \$5,000 a year. If one dollar out of every \$15,000 gross received by California fruit-growers were put aside; or expressed in another way, if one prune, one peach, one orange, one cherry, one grape, were put aside for every 14,999 prunes, cherries, peaches, oranges, etc., sold, such a bureau could be supported.

And would it pay? I tell you it would. I have been in California long enough to be first surprised, then shocked, then saddened by the short-sightedness displayed in regard to this matter of really knowing the ways and facts of our enemies of orchard and vineyard. And other states show by their actions that they know that knowledge pays. Perhaps we ought to be satisfied to raise, despite our leniency to our enemies, more fruits than other states. But we are not satisfied when we remember that it makes our twenty per cent of loss just so much bigger. Let us cut down this loss. We can't cut it wholly out. But we can save a few millions by spending a few thousands. This sounds like Tonopah or Alta Vista heights. But it isn't. It is because the knowledge of science is practically free. Nobody speculates in pure science.

Now, I must interject a personal word. I can write what I have because I have no ax to grind. I have my own life job. It's better than any you can give me. I am disinterested except for the interest I have in California and my fellow horticulturists. For I, too, as what Santa Clara Valley resident has not, have a few prune trees. I can clamor for money and for the establishment of a position with an easy conscience and no face of shame—for I am clamoring for somebody else. Who he is I do not care—except that he be honest, competent, thoroughly trained, eager to work and in love with just the kind of work he is to do. Such men there are. And they can do much for us.

We have even produced a few young men in our laboratories giving much promise. And what happens to them? Does California get the benefit of their work? Not at all. My best graduates are government entomological workers in Japan, in Hawaii, in our own country outside of California. When we get a young man like Dudley Moulton

ready, he is snapped up by the government service just as soon as he gets to helping Santa Clara County in a way worth while. Carl Morris is tackling bravely the big thrips job in the same county. He needs time and backing. It is a serious and a large undertaking. He can not go out and begin killing thrips to-morrow. It will only be after weeks and months of close, careful study that he or anybody else will be able to get to killing. But it is his kind of work and Moulton's that in the long run counts most. Tackling the big jobs and going at them from the ground up is the sort of thing we orchardmen sorely need in California.

Get a man with a couple of assistants; give them living wages; a little office, not large, for out-of-doors will be their principal workroom; and give them time and encouragement to investigate. Don't expect them to wave a stick, or throw dust in the air, or puff smoke out of a covered wagon like the Indian medicine man or a rain-maker. Don't demand a general exodus or a wholesale mania of suicide on the part of the insect pests when these men begin to study. And don't urge them to throw dust in your eyes. They can do it all right enough—for a while. They can talk Latin words and prophesy good news. But guff is not the stuff we want. And sensible men know that results worth while do not come in a day or even a month. They come from long, persistent, thorough, scientifically honest study and work.

Well, you can get just that for a few thousand dollars a year. Adequate support by the State through legislative appropriation or directly from some organization of fruit men—just as the sugar planters of Hawaii maintain their own special entomological investigating bureau—for scientific investigation of the insect and fungous pests of fruits is needed sorely. There is great, great need of more knowledge. This knowledge can be got. How it can be got I have tried to tell you. And that is all that I came up here from Stanford to say.

Mr. Ehrhorn read the paper by Mr. E. K. Carnes on "Practical Work in Combating the White Fly," as follows:

PRACTICAL WORK IN COMBATING THE WHITE FLY.

BY E. K. CARNES, OF SAN FRANCISCO.

The practical work against the white fly in this State, undertaken by the State Commission of Horticulture, in so far as it has progressed, up to the present time, may, for the purposes of this paper, be divided into the three following stages: The work at Marysville, the work at Bakersfield, and the preliminary work at Oroville.

Upon the discovery that the white fly (*Aleyrodes citri*) had at last made its appearance within the boundaries of this State, the citrus

interests of California were at once brought face to face with the gravest problem that has confronted that industry for many years. The Florida white fly being undoubtedly the most dreaded of all citrus pests, and known the world over as the one most difficult to combat, the announcement that this dreaded foe of citrus culture had finally eluded the quarantine guardians of this State, had gained admission, and was firmly established on various trees and plants in the city of Marysville, brought forth exclamations of fear from every corner of the State.

One of California's foremost industries is that of citrus culture; the yearly revenue produced from our present planting reaches almost forty millions of dollars. The distribution of this enormous fund finally reaches every industry in the State; consequently, when it was announced that this great industry was threatened to the point of almost complete destruction, by the invasion of this Florida pest, the most drastic measures were necessary to be enacted and every effort exerted in an endeavor to stay its march and attempt to eradicate it at its point of first discovery.

Unfortunately, that point was the beautiful city of Marysville. How it came to be brought here is somewhat of a conjecture, which probably will never be satisfactorily solved. After due deliberation in proportion to the danger which confronted us, and after submitting specimens of the pest to all those in authority, even up to the highest in the United States Government, and in each case the classification being verified, we then knew that we had a battle before us with the worst of all citrus pests.

California has stood in awe of this particular species of insect pest for many years, and as far back as 1901 quarantine regulations were enacted against the possible introduction of the same into our State, and since that time a great deal of study has been devoted to the pest; all works on the subject were freely consulted and its life history carefully considered; all remedies and artificial means of eradication applied in other states were watched with much interest; different experiments were noted and filed for reference, should the pest ever make its appearance in our State, so that we would be in shape to handle the same, in the most intelligent, practical manner, and avoid the mistakes of theoretical ideas and impractical experiments.

Upon the first appearance of the pest in California, the forces of the State and County Horticultural Commissions were at once brought together on the subject, the point of infestation was visited, and inspectors were placed in the field, the ground gone over very carefully to ascertain the boundaries of infestation, ways and means of procedure discussed, various ideas that had been tried in an experimental way in other states were considered and the works on the subject again carefully gone through, with the result that the previous

knowledge of the pest almost entirely consisted of its habits and life history in other states and other climes—with the exception of a little field work in Florida—which was more in the way of a scientific experiment, from which, apparently, no practical results were obtained. All other artificial means of eradication were carefully considered; spraying had proven a dismal failure; fumigation had recently been employed by the United States Government in an experimental way in Florida, with the assistance of one of the County Horticultural Commissioners of Los Angeles County, and had proven quite satisfactory; but this method of treatment could not be considered in this case, for the space of time before another brood of flies was due to appear was quite short, and the size, location, and number of the trees were such that to have attempted fumigation would have necessitated practically the use of every fumigation tent in California. Other means were considered, with the result that they were shown to be impractical under the present conditions. The peculiar habit of this insect in attacking only the leaves of its host plants gave hope of the success of a plan of attack which it was finally decided to inaugurate. Most of the trees affected were seedling varieties, and had no commercial value; again, they were badly infested with several species of scale insects. These facts were taken into consideration, and it was decided that the only possible plan of campaign that gave any promise of success was to promptly defoliate the trees. Time being the essential feature, to prevent the immediate danger of spread; also, by defoliating we would clean up the other pests mentioned, and leave the trees in shape to bud to better varieties, making them commercially valuable as well as ornamental.

In addition to our regular preliminary work, practical men from the county commissions, and men representing enormous horticultural holdings from all over the State, who have had years of experience in fighting all sorts of injurious insects with all known remedies, were sent to the infested section—these sober, conservative horticulturists were taken into conference before the final plan of campaign was announced.

Consequently on June 12, 1907, the defoliation order was issued, the same being sent to all the county commissions in the State, as well as in the infested county, as prescribed by law.

It was also necessary to determine what plants besides the known host plants might be infested, and inspectors were placed in the field—careful, experienced men—with the result that additional host plants were discovered that no writer on the subject had known to be such. One especially was the lilac (*Syringa vulgaris*), which was found to harbor the pest in goodly numbers. As this shrub was not mentioned in the defoliation order, considerable objection was

made to defoliating them on this account, but only in a few cases was much difficulty met with.

In outlining our campaign, the first step in the work was to carefully consider the life history of the insect—to discover its most vulnerable point of attack.

The life of the insect is divided into four distinct stages: first, the egg stage; second, the larval stage; third, the pupal stage; and, fourth, the adult or winged stage. The flies pair very soon after emergence, and the females generally begin depositing eggs in from twelve to thirty hours; they seem to prefer the under side of the very young and tender leaves, except in cases of very bad infestation, when the old leaves are also covered. Writers differ on the number of eggs deposited by each female, but they seem to agree on from twenty-five to seventy-five as the limit, warm weather being conducive to prolific oviposition and cold weather the reverse. The eggs hatch in from three to twenty days, depending upon the temperature; however, a large percentage of the eggs are unfertile. The young when hatched somewhat resemble the young of a scale insect (*Coccidae*), and crawl around for a few hours before they settle, which consists of inserting the mouth parts into the leaf and the secretion of sufficient wax to fill the space between the insect and the leaf. It now becomes a fixed form, until after passing through the last stages of the nymph form, where wings are formed in both sexes and the entire structure of the insect changes or undergoes a molt and the delicate white fly emerges, leaving the molt attached to the leaf, which is quite conspicuous. In normal conditions the insect will pupate in from twenty to thirty days, and the mature fly will issue in from ten to thirty days thereafter, making the time of one brood from egg to adult about forty or fifty days in summer to six months in winter. While the life of an individual adult fly is very short, being from three days to a week, according to various writers, many mature flies were kept in confinement alive for twelve days in some of our experiments. The first brood appears in the spring in large numbers and are present for a couple of weeks, then suddenly disappear after laying their eggs. This brood is well defined. The next brood appears in midsummer and is not as distinct as the spring brood. From this time on there is a tendency to continual breeding until cold weather appears, when the adults entirely disappear, leaving only the fixed forms firmly attached to the leaves, and no adults are to be seen until the spring brood issues.

At the time of the discovery of the pest in this city, the spring brood was at its height, and thousands upon thousands of adult flies were in evidence. From a knowledge of its life history, it was seen that the first opportunity to attack the pest was immediately after the disappearance of the adults of the spring brood, which would leave us only

the eggs, larvæ, and pupæ fixed forms to deal with. As the pest only attacks the leaves of its host plants, by destroying the foliage of such, with the fixed forms attached to them, presented the most practical plan of campaign possible in the limited time between broods. To insure success all the food plants must be located, all the foliage from such removed and destroyed, and the work completed before the issuance of the midsummer brood. It seemed almost an impossibility, even under the most favorable conditions. With the enormous amount of plants and trees to be defoliated, the scarcity of labor, the fruit season at its height, with seemingly everything against us, it certainly presented a herculean task. We will cheerfully admit that it was not an ideal time to attempt the work; but the white fly had by this time become well known to almost every resident of the city, and to a large majority of the children; many persons were visiting the city from the adjacent country, and would, unthinkingly (not being familiar with the danger attending such actions), capture mature specimens of the pest to exhibit to friends in other sections. This grave danger of having the pest spread over a great many sections of the State, in a very short time, made it all the more necessary to commence work immediately. In the face of all the arguments set forth by many persons, who insisted that the season was the wrong time to attack the pest, I feel safe in stating that should such a course have been followed, viz.: the let-alone-policy until the winter season arrived before commencing active work, the white fly would now have been practically all over California. Our first idea, then, was to reduce the danger of spread to a minimum in the shortest possible time, and later on, when the trees would be in shape to be handled and the season of the year more favorable, to give our time to efforts of complete eradication.

The campaign, as outlined then, consisted of the defoliation of all known host plants, and constant inspection covering the infested area, extending through the winter months. In case of any adults being found, or if anything should happen during the defoliation to delay the work sufficient for a new brood of flies to appear on any host plant—for in any and every undertaking as extensive as this one; one that so far is unparalleled in the horticultural annals of California; the unforeseen contingency must always be counted upon—then the outlined plan included reinspection of the new foliage as soon as it appeared. This was closely watched and allowed to remain long enough for any belated individual which might happen to escape and reach this tender growth, which is the ideal food for *Aleyrodes citri*. Judging from our experience, which covered many weeks among the pest, the flies would go immediately to this young foliage, deposit their eggs, and soon disappear; thus we again had the progeny of the outlaw flies trapped on the young growth, with the adult flies dead and their

offspring anchored on the leaves. Men were then started to work stripping the defoliated trees of their new leaves and destroying the same. Constant inspection was carried on, each block was platted separately, and weekly summaries made of the same.

An inspection was recently made showing much completer work than the original plan had promised, our original idea being, primarily, to prevent the immediate spread. The presence of mature white flies has been reported several times, even recently, by persons who have not looked into the matter thoroughly before spreading the report that they were *Aleyrodes citri*. It must be remembered that in Marysville and the surrounding country, *Aleyrodes* species are extremely common. These are native, harmless species, which, in the adult stage, closely resemble the *Aleyrodes citri*, the insect we are trying so hard to eradicate. In one case in particular the adult flies were reported on an orange tree. The place was immediately inspected and several specimens of mature flies were found upon the foliage; however, diligent search failed to reveal the eggs, larvæ, or pupæ of any *Aleyrodes* whatever; yet the mature forms were there, and to a person not familiar with the work it was taken for granted that the work had been a failure. Upon looking carefully, taking into consideration the native forms, there was found upon the porch a wisteria vine that was heavily infested with *Aleyrodes acacia*, and the dense foliage full of mature or adult flies. By shaking the vine they were disturbed and several specimens were carried, by a little breeze, directly on the orange tree. This is one case of many where reported adults have proven to be native species.

A long practical experience in combating many different forms of destructive insect pests over extensive horticultural areas in California "warns us" not to be so egotistical as to make the positive statement that the white fly has been eradicated in Marysville, but it is now certainly under control and in such shape that should it show up as is expected in a certain watched spot, it can be handled with comparatively little expense or trouble. During the winter and with the completion of our campaign satisfactory results will undoubtedly be recorded.

The horticultural laws of California are very stringent. First, they make it the duty of the State Commissioner of Horticulture to determine whether a pest is dangerous or not, and to prescribe the remedy that should be applied in each case. This notice must be sent to each County Horticultural Commission and instructions given them in detail. This notice is made a part of the county notice that has to be served on each party owning or having in his charge infested trees, and is accompanied by an order from the County Commissioners declaring the pest a public nuisance and ordering the same abated within the time given and in the manner stated. Thus we see that it is made the

duty of the County Commissioners to enforce the State Commissioner's order. In Yuba County the Commissioners were duly served with the official notice, and they immediately started to enforce the order. Of the excellent manner in which they carried out their part of the program there can be no question. The duty of these gentlemen, which was to compel their neighbors to destroy their shade trees and to temporarily disfigure their yards, was not a pleasant one, and great credit is due each of them, especially the Marysville District Commissioner, who remained faithful to the discharge of his duty even in the face of incurring the personal enmity of his town-folks.

I beg your forbearance while I relate a few of the obstacles that obstructed and delayed the workings of the plan of campaign as originally outlined, and which obstacles served to make the direction of the work anything but a bed of roses.

Whatever prejudices may have existed at the beginning of the campaign, as of one section of the State toward another, this gathering to-day is convincing proof that all such engendered passions have been buried and that we are all now loyal California citizens striving for the general upbuilding of our State.

I express my own sentiments, and I hope yours also, when I say that no man is to-day a true lover of this glorious State who would endeavor to rekindle the fires of sectional strife from the dying embers of the unhappy beginning of the white-fly campaign; and any facts that are mentioned in this paper relating to the actions of the citizens of Marysville during that time are given only as history in connection with the work, for having met a majority of the citizens, in the routine work of the campaign, I can only speak of them all in the highest terms of praise, and I glory in their justifiable pride and defense of their city while dealing with a vexing question which they did not fully understand, and one that time would not permit of a campaign of education; so while referring to some of the circumstances that attended the work I wish it understood that no discourtesy is meant to any one and I shall not knowingly state anything which could, by any construction, wound the feelings of any resident of this city.

Upon the first intimation that drastic measures were to be employed against the invasion of the pest, almost simultaneously arose the story that the southern section of the State was endeavoring to wipe out its worthy antagonist—the northern section. Much credence was given the story, which became generally circulated. This was followed by the announcement that those in charge of the work were to receive a fixed price for each tree destroyed. These little stories caused a great deal of annoyance and tended to keep many people from proceeding with the work. However, the arguments of the cooler heads soon prevailed, and these citizens soon convinced those in doubt that the idea

was ridiculous, and the prejudiced feeling toward the south gradually subsided; but the same story would crop out at intervals, and some good convincing talk was necessary to disprove it.

Then came the story that to defoliate a tree would kill it, for it must be known that very little budding had been done on the city lots, and the majority of the trees were of the seedling variety, ornamental only, no oranges being grown for commercial use; and naturally the owners of such trees did not recognize, as quickly as those who grow citrus fruits for profit, the great danger of allowing the dreaded pest to spread over the State.

At a very critical stage in the eradication work, when every energy was being expended to complete the work before another brood of flies would be due, opinions arose which varied widely as to the proper course to pursue, based on advice given by people unacquainted with the real facts of the case. The questions involved were of a legal nature, questioning the right of the authorities to proceed along the lines as indicated in the official order. Many owners insisted that the legal advice given them to resist the order was applicable to the present situation as well as to matters not involving horticulture. These few valiant defenders of the foliage of Marysville were joined with other leaders in a movement to prevent what they believed, at that time, was an attempt to destroy the verdant beauty of their home city by unconstitutional means. Injunctions were served on the Commissioners and the work stopped at a very critical time. Here again the law's delay caused more valuable time to be sacrificed. The matter was brought before the court, with the result that the order was upheld to the letter, and the work, already late, again proceeded.

The cause whereby the work was not completed within the specified time is directly traceable to influences exerted and advice given from sources not authoritatively interested and from an assumed advisory standpoint only, which resulted in the bulk of the voluntary work being delayed until the last minute, making it a physical impossibility to complete the same on time.

As enforced eradication can not be executed until after the expiration of preliminary service, the enforced eradication must then follow certain prescribed lines as indicated by our legal statutes. This important point seems not to have been considered by many persons who have severely criticised the failure to complete the work in the given time.

While we were not unconscious of the many pointed insinuations aimed at us, both orally and in print, the overpowering sense of our duty to so important a cause, and realizing the great interests at stake, outweighed any desire on our part at petty retaliation, and we refrained from replying to any attacks upon us, although the opportunities to do so were legion. Instead, we proceeded calmly and impartially with our

work and, by so doing, I believe we not only won the respect of the citizens of the city but merited the confidence of the entire army of citrus growers throughout the State.

Another source of delay, which in the aggregate amounted to a great deal of time, was the obstinacy of the people in relation to the true view of the work—in some instances positively refusing to discuss the matter at all; in others, declaring the work was simply a graft and expressing themselves in no uncertain terms. Added to the anonymous letters we received, such pleasant little recreation as crying "Graft!" was indulged in; although I am happy to add this did not emanate from bona fide owners, but rather from that element, to be found in any city, which, not being financially interested, take great interest in all current issues.

Again, probably estimating the strength of the law by the size of its representative in this particular case, invitations to indulge in fistic exercise were frequently extended.

The State and County Horticultural Commissions came in for a great amount of undeserved criticism, because the work was not all finished in a minute. At the time the work was at its height, labor conditions were such that in a majority of cases the owners of infested properties were compelled to do the work themselves, it being almost impossible to engage help, and the work had to be done before going to their daily employment or business, and after business hours in the evening. Almost every available team was engaged in hauling fruit, which season was at its height, consequently the brush was not removed as fast as those in charge of the work would liked to have seen it done. The city authorities placed all their available teams on the work, employing additional teams when possible, for the amount of brush from the defoliated trees was beyond measure. The disposition of this brush was in itself an enormous task. Considering the fact that every possible effort was exerted by a majority of the citizens to comply with the law, great credit is due each and every individual, as well as the officers of the city and county, for the excellent spirit displayed and the great sacrifice they made in order to save the citrus industry of California.

When we take into consideration the fact that the people of this section have never been troubled with insect pests and have previously had no acquaintance with horticultural authorities or been compelled to eradicate any pests; that the subject was practically new to them; that they were unacquainted with the workings of or dangers from destructive insects, and could not understand why it was necessary to take such drastic measures to stay the spread of this pest; and a point that made it still more difficult was the fact that the pest had invaded the trees on the streets and homes where no value was placed on the product—only the beauty and shade which they afforded were considered in

their worth; again, the county of Yuba having no commercial citrus orchards to protect, it must be admitted by all that it was a rather vexing condition which presented itself to the people when an order was issued to defoliate all citrus and other food plants of the pest.

Time would not allow for a campaign of education, which would have made the work easier, as the people would have then understood the danger that threatened our State, and there would have been no hesitancy in obeying the order. As it was, in each and every case where it was possible to personally meet and talk with owners, they were immediately satisfied and commenced the work.

There is another and unknown side of the question, with which the general public is not acquainted, in connection with the sacrifice made by the good people of Marysville. The main point that has held the attention of growers throughout the State, in regard to the trees in this city, is that they had no commercial value; yet I know many trees were closely associated with family history—trees planted and cared for by departed members of many families. In these cases, I know from conversation with the present owners, that no amount, in dollars and cents, could cover the loss of these trees, which were held almost as sacred, and to be compelled to force defoliation in such cases was, indeed, most unpleasant.

During the active part of the campaign, and quite naturally, congeniality was not the dominating spirit in the air. Could you have been in this city during the campaign of last summer, when it was as warm—well, as warm as it gets in southern California!—no one willing to work, labor scarce as hen's teeth, only a few hours before the time limit mentioned in the defoliation notice would expire, and the pleasure of having the county authorities coming in and doing the work for you, at your expense, and money tight. About this time, you, who had charge of the work, would happen along and find the owner up a tree, sweating, puffing, and sawing, the thorns of the seedling gently pricking his arms and body. Now, imagine yourself as this person, you who had planted that tree yourself, and for many years were wont to bask in its beautiful shade, and now to be compelled to defoliate it, and to do the work yourself; suddenly, you hear a ripping sound, and as you gaze below you find that your second best pair of trousers has encountered a thorn, and as a result a rent about three inches long appears; well, you straighten up to resume your work, your visage is set with hard, determined lines, and as you resume the upright pose you gently tear the sleeve out of your shirt. In the midst of this operation, while you are hot mentally, internally, and outwardly, into your yard comes the cause of all your trouble in the shape of one of the officers in charge of the work to see how you are progressing. Please, don't imagine,

even for a single moment, that that man up a tree comes down smiling and asks you into the house to have a nice cool lemonade!

Looking back on the thousands of trees, plants, and shrubs that were literally swarming with white flies in the spring, and considering the great amount of territory covered, the obstacles met and overcome, the unfavorable season of the year in which the work was attempted, with all conditions seemingly against success, when we had to proceed very cautiously with the work, ever trying to rush it to completion in the specified time, and to have succeeded so far that to-day it is nearly impossible to find the pest here, I believe the work at Marysville so far has been attended with a fair degree of success and that the main object has been achieved, and that by spring the pest should be exterminated.

Bakersfield.—The white fly invasion at Bakersfield presented an entirely different case. There, we had but a single owner to deal with, Mr. William Tevis. The infestation occurred on his beautiful estate at Stockdale, which is situated about five miles from Bakersfield, and practically surrounded by pasture land, and the chances of the pest spreading quite small. Upon discovery of the pest, the place was immediately quarantined and all persons kept out. The owner was more than anxious to do everything in his power to assist in the eradication work and placed every convenience at the disposal of the authorities. Considerable experimenting was done at this place, as the conditions were ideal. With the cooperation of the southern commissioners a fumigation outfit was rushed to the scene of infestation and hydrocyanic acid gas was used, in different strengths, exposures, and doses. Trees that were necessary to be defoliated were first used for experimental purposes and the foliage burned, dropped or left in perfect condition. Different strengths were used on the insects and a plan outlined for the trees, fumigated and left standing, for trap purposes, which consisted of refumigation and inspection until final work during the winter months.

Repeated examinations at this point of infestation show excellent results and the white fly in the past tense; however, the inspection and final treatment of the trees will be carried on as a safeguard, just the same as if the pest could still be found.

Oroville.—The invasion of the white fly at Oroville presents about the same conditions as it did at Marysville, being scattered over the city trees. The varieties of these trees are principally seedling, with quite a percentage of Navels. Our experiments at Bakersfield have made possible the intelligent use of fumigation with hydrocyanic acid gas against this pest, and the option will be given the owners to fumigate or defoliate—outside the infested area. There will hardly be the trouble experienced at this point as previously encountered, for the Marysville campaign has been an education in this line and the anxiety of the

residents to have the pest eradicated is very strong, as the commercial orchards are in close proximity to that part of the city where the infestation occurs. A plan of campaign consisting of defoliating the infested area and the remainder of the trees to be fumigated or defoliated to catch the spread of the pest, which in the early stages is very hard to detect—and at the same time to clean up the trees of yellow scale (*Chrysomphalus aurantii*, var. *citrinus*) before it reaches the commercial orchards. Preliminary work is now well started at this point—the active work to commence December 15th and to be finished by February 15th, which will allow for a thorough inspection and for more work if necessary before there is danger of the spring brood appearing. We believe, from past experience, that an intelligent, practical plan of campaign has been mapped out for this invasion, which promises successful results, and having taken into consideration that possibly something may arise, ample time has been allowed for the unforeseen. With our past experience as a guide, taken together with the favorable season of the year, everything points to a very successful campaign.

In conclusion, let us not count on the miraculous aid of chance in the complete eradication of this dreaded pest from our State, but every energy should be exerted. Ample provision should be forthcoming for carrying on the work as long as it is necessary. The most critical inspection of plants coming into any county should be made, and let us not forget that we still stand in danger of having this same pest sent direct to us into new sections from Florida and the Southern States. Let no stone remain unturned to erect a mighty barrier against this ever threatening danger—and this point is especially important for the northern counties—which will amply repay any expenditure and prevent a repetition of the hardships which you have just borne with so much fortitude. And now let us indulge in the more pleasing thought that your citrus industry is but in its infancy, that the population of your northern counties will increase in numbers and achieve much more than you have already accomplished, and that your people are intelligent enough to see and vigilant enough to guard against impending danger to your growing industry from whatever source it may come.

MR. JUDD. I want to supplement that paper to the extent of saying that it seems to me one of the wisest things that could be done by the State Horticultural Commissioner would be to publish that, or the essence of it, so far as it relates to the campaign in Marysville, and it should be sent to every city and town in the State of California troubled with insect pests. Every little town has in its gardens various kinds of foliage plants and trees, citrus or otherwise. My experience has

been that you can not find one yard but that carries some insect pest and, as the paper says, the tree is dear to the heart of the person who planted it, and they smile at you when you say that the trees ought to be attended to. These little towns are the breeding grounds of the State of California for all kinds of insect pests. A man comes in with a load of hay or a load of wood and he takes it through some shrubbery to the barn or woodshed; he takes the wagon home and the insects have fallen from the tree to the wagon, and maybe he has at home a tree that is part shelter and part barn and part wagon house and he leaves the wagon there and that section of country is infested; and as long as the towns persist in making a breeding place of the yards to infest the whole State of California, just so long will we have it. That point can not be too markedly expressed. Every one in the State of California is interested in this fruit industry. Every one who lives in the town has as much interest as the person who lives in the country, and far more so, because just as soon as you wipe out the industry your town will shrivel up. Now, that paper should be well circulated. It would have this effect: it would stimulate the Horticultural Commissioner in his own neighborhood, of course. It would show the right side of the question to the people who always object to your coming into the yard and expressing dislike for the manner in which they are protecting the insects.

MR. FEMMONS. If it is in order for just a few remarks, I feel like trying to say something. In our mountain section, and I presume it is so all over California, we have a number of different species of native white fly. I have been watching their work, not in a scientific way, for years, and from that observation I think I can understand something of the difficulties that you have in fighting this pest here.

For instance, we have one species of the white fly that attacks our common chaparral bush; another, perhaps, of the manzanita. It is very prevalent on the California laurel. You take hold of a bush of the laurel, particularly, and of the other species where you will see them sticking to the leaves, and give it a little shake and the white fly will come out like a cloud. In one particular location that I know, it is very prevalent; along the road and the stage line to Yosemite the chaparral brush has been dying and is almost gone. It is a demonstration of what that particular insect will do, small and insignificant as it is, and when it gets into our orchards—that is, the species that attacks our citrus fruits—it is almost impossible, in my estimation, to eradicate it, at least in any reasonable time, and particularly under the labor trouble. But in that paper, if I caught the words aright, it appears to me that those trees in our yards about the town, wherever they are situated, that perhaps have been planted by some hand that

has passed away, are the most difficult to handle. It hurts to see them mutilated, as I see one out there now, yet it is throwing out new life, it shows vitality in that tree—still, that sentiment is going to be one of the hardest to be combated. Those trees seem almost like the touch of a beloved hand or the sound of a voice that is still. You go into some yards where people have that sentiment, that heart, that soul connection with those trees, and you can scarcely bear to see them mutilated as those are. But necessity is behind it all, and, judging from our native species of *Aleyrodes* and the effect they have on the native shrubbery, that necessity stands face to face with our people of California and the pest must be eradicated if it is possible. (Applause.)

MR. MILLS. I have been very much struck with the remarks of the gentleman who has just sat down. He made a remark which is exactly true, that he has no hope of effectually eradicating the pests we have. I doubt very much if we will ever be able to eradicate the pests we have from the trees of our State. We have many pests in the south, we are fighting them, we are making a winning fight—that is, we are keeping them under subjection, in order that we may be able to make a living and a little more. You are interested with us. We admire immensely the self-sacrifice that has been made in this town and which will be made at Oroville. We in the south are willing to make the same. We have pests there you do not want here, the purple scale and the black scale and the red scale and others. You have got some of them, but not to the extent we have. While we are fighting to keep under the pests we have, we must fight to keep out the pests we have not. This pest here we are very fearful of in the south, for we have thirty millions of income that it could destroy, had we not money and energy and faith to combat it. You have started in splendidly. But there are other pests; the Morelos worm threatens us on the south. People coming from Mexico can bring it in from Nogales without any hindrance. There is the fruit fly, worse than the one we have, that is in foreign lands. Quarantine is the thing we want to put up to our legislators. I think we have the measly sum of about \$7,000 for this work in this State, whereas our citrus industry gives us thirty millions of dollars, and the grower of citrus fruit is not the only one benefited thereby. It was well said here yesterday by the flowery orator, John P. Irish, that the blocks of the cities first originate in the blush of the fruit. It is true. We dig them out of the soil and give you the money to rear your magnificent blocks, even in this new building of San Francisco. The agriculturist, the horticulturist, is the man on whose shoulders you citizens in this State are dependent for your welfare. We are asking that you provide us quarantine. Shall we not get for the green fruit and the citrus, for the great interests of the truck farmer and the grain farmer—shall we not have sufficient money and sufficient men like this man who read the

paper and this man who presides over us—shall we not have all of them to protect us from the pests we have and those we have not.

There is a paper—it is not on the program; I think it ought to be read at this time—written by a man who of all others knows well whereof he speaks, and I wish you would hear him. Mr. Cundiff of Riverside has prepared a paper on this question of quarantine, and inasmuch as we have the time I think it would be wise for us not only to hear it, but we should call upon the Legislature to give us, not only \$7,000, but \$700,000, if we need it, to protect those interests from which the life, the religious life, the family life, the social life, all the life comes. Shall we not go to the Legislature this coming year and demand—and I do not think we will have to shout very loud—to get \$50,000 or \$100,000 or \$250,000 to protect all the orchards of this State from the incoming pests from every corner of the world? In the mountains this year I saw the beautiful spruces going down by acres, miles and miles of them beyond saving, but if we can save our orange groves and our lemon groves and deciduous groves and all our truck farms through the efforts of these men, rightly assisted, we shall live and prosper, but not otherwise. (Applause.)

THE CHAIRMAN. Mr. Ehrhorn has a paper that is technical, but it is touching a point that is of interest to all of us.

PRESENT STATUS OF PARASITISM.

BY E. M. EHRHORN, OF SAN FRANCISCO.

In the course of the ages through which this world has passed, there has been a constant struggle for supremacy among animals and plants, a struggle for the survival of the fittest, and out of this contest there has grown a certain fixed ratio between all existing life. This ratio is especially marked in the animal kingdom, in the class Insecta, which predominates to such an extent as to represent four fifths of this kingdom, and, were it not for a counter check through insect parasitism, vegetation, which is now seriously damaged, might be wholly destroyed. The struggle for supremacy is continually going on in both the vegetable and the animal kingdoms, and plants are struggling among themselves, the lower forms generally trying to outdo the higher forms. Animals are constantly arrayed against one another in the struggle for existence, and the class Insecta, especially, takes a delight in attacking members of its own class.

We note, then, that there exists a wonderful law, which seems to guide all life, and we find that by this law all enemies of plant and animal life are constantly controlled. This is the ideal natural condition before man interferes and causes a break in Nature's chain of consequences by

the planting of large areas of orchards, vineyards, grain fields, and so forth, or by the importation of pests from other countries. We thus find a complete disarrangement of the natural order, which generally ends in great loss and damage to our industries.

We are told that the losses caused by insect attacks on agricultural products exceed the entire expenditures of our national government, and that the value of these products, despite this fact, amounts to about five billions of dollars, the average loss caused by insects being estimated at five hundred million dollars. To all this must be added the annual expenditure employed in fighting insect pests by artificial means to enable us to save a portion of the crop. Huge as is this annual loss, it would undoubtedly be much greater if the pests were left unchecked. A great portion of the successful saving of crops can be attributed to the strides made in applied entomology within the last half century, including in this branch the ever-growing experiment in insect parasitism.

Insect parasitism has been known for a long time. Many a collector of butterflies has been greatly disappointed, after patiently waiting to rear some rare moth from his breeding cage, only to find a collection of small parasites clinging to the sides of the cage, while all that remained for him was the empty chrysalis with a few exit-holes from which had escaped the hiding foe.

It is within the last twenty years that insect parasitism has been taken up as an economic adjunct to agriculture. The outbreak of *Icerya purchasi*, the cottony cushion scale, in California, and the knowledge of the existence of its natural enemies in its native land, Australia, started one of the most interesting and most successful experiments of insect control by insect parasitism ever recorded in the world. No fruit-grower of California who had any interest in horticulture, in the days of the *Icerya* plague, need be reminded of the anxiety which then prevailed all over the State lest the terrible white scale should forever destroy our beautiful orange groves.

This is an instance where natural conditions had been changed by man. A prolific insect had been brought by a fancier into this country on some plant from a foreign country, where it had been kept in control by its natural enemies; but, unfortunately, these were left behind. The pest, not being checked, multiplied rapidly, and soon a great struggle began between it and plant life and great loss and expense were the result. To restore the balance of nature we had to introduce the enemy from its natural home; and under conditions as favorable as in its native land, we soon succeeded in establishing a check so complete that now we find the pest at rare intervals and in small colonies, invariably followed up by its ever persistent enemy, *Vedalia cardinalis*.

This remarkable epoch-making experiment in economic entomology

aroused the scientific world, and all eyes were turned toward California, for it was she who, after spending hundreds of thousands of dollars, had conquered a terrible pest, which threatened to destroy her citrus industry, producing to-day over \$30,000,000 annually.

Having succeeded with this remarkable experiment and finding ourselves interested in this work, we continued the search for enemies of our various other pests, since which time several expeditions have been undertaken in the endeavor to find, first the home of the pest and then the true parasite of it.

It is a well-known fact that all insects have certain enemies which prey upon them, either predaceous (those which live externally and generally devour the host), or parasitic (those which are generally found inclosed in the body of the insect or in its covering.) Of the first class we have a host of individuals in the various orders. Paramount among these are the ladybirds (*Coccinellidæ*), to which belongs the *Vedalia cardinalis*, and which are the important enemies of plant lice and scale insects. Among other orders we have the larvæ and adults of many beetles, the larvæ of the lace-wing flies, and those of the *Diptera*, the syrphus flies. All these attack other insects, each selecting the particular family it can master, the Carabid beetle anxious to devour the large cut-worm, the lace-wing and the syrphus flies ever ready to suck the juices of the tender plant lice. They all have their favorites and all are hearty eaters. Whenever a pest becomes abundant it at once means that some favorable condition for the propagation of its enemies is at hand. These shortly appear on the scene, and although at first few in number, soon deposit eggs, which quickly hatch into larvæ, some of which are very minute and are often overlooked; these begin to feed, molting at intervals, and we soon notice the very odd but striking forms of the pupæ resting on the leaves, the battlefield as it were, surrounded by the empty skins of the pest. In a short time there appears from the pupa the adult, which continues the good work as did the last generation.

The parasitic insects include the great orders of Hymenoptera and *Diptera*. The first contains probably the greatest number of true parasites and presents without question the most remarkable phases of insect parasitism. Roughly speaking there are about 30,000 Hymenoptera described. Probably this number could be greatly enlarged, and no doubt will be, as there are discovered every year many species which are new to science. We shall no doubt be able to multiply the present number by ten, and this will give a rough estimate of what we may expect in the parasitic group. It is in this order that we hope for great relief in insect parasitism.

Some of the smaller species of ichneumons and chalcid flies are very prolific, and among the records we can find instances where, from one

host, a cabbage plusia, one of the cut-worms, over 2,500 individual parasites were reared. In our own State we find that the *Comys fusca*, the parasite of the apricot scale, has parasitized from 85 to 95 per cent of the scales in some of the infested orchards.

Many of the parasites have different habits; some attack the eggs of insects, some the larvæ, some the pupæ, and some species carry off the adults and store them in well-prepared nests, where, when sufficient food has been provided for the offspring, the egg is laid among the stored individuals. Probably the most interesting workers, and those which do not seem to mind the close observer, are the aphid parasites, the Braconids. It is a most wonderful study for any lover of nature to observe these little parasites make an attack on a plant louse. They are ever on the move and seem to be able to tell whether the aphid has been already attacked. When this is decided, the Braconid brings its abdomen under its thorax, takes aim at the aphid, and with a sudden, quick motion, thrusts its egg into the body of the host-to-be, and is then ready for another. Many of you have noticed the dead, light-brown, swollen bodies of plant lice on the leaves of the cabbage and other plants. These contain parasites and, if closely watched, one will soon notice a small hole in the body of the louse. This is the exit hole from which the parasite has escaped.

Some of our common caterpillars are attacked by ichneumons, and we find that after spinning the cocoon they remain unchanged instead of continuing their metamorphosis and there appear a number of smaller cocoons, which in time produce the adult ichneumon parasites.

Among the Diptera, the true flies, we have the tachnids, which are true internal parasites. The adult deposits its eggs on the caterpillar and the young maggot when hatched enters the body and begins to feed. The victim soon looks sickly and is hardly able to spin a cocoon. After completely devouring the contents of the host, the larvæ, for there are generally several, are full grown and work their way out of the body wall and fall to the ground, where they pupate and remain during the winter.

As stated above, the beginning of insect parasitism in California started in the year 1888, when, disheartened by enormous expenses and the great reduction of crops, the growers caused the search to be made for the natural enemy of the cottony cushion scale, which resulted so successfully and made *Vedalia* the shibboleth of insect parasitism. Unfortunately, this ladybird feeds only on the cottony cushion scale, and we had to search for other species to help reduce our other pests. We soon received, through the diligent search of our collector, many species of ladybirds, some of which proved a great help toward the reduction of our insect enemies. One species, in particular, which has done much to reduce the olive scale in several coast counties, is the

black ladybird, *Rhizobius ventralis*. It increased with wonderful rapidity and the scale was greatly reduced. This species likes a cool, moist climate, and wherever introduced under such conditions, gives good results.

Great efforts have been made for the discovery of a parasite for the red scale, *Chrysomphalus aurantii*. This is by far the worst enemy of our citrus industry. Several species of ladybirds have been introduced to prey upon it, and one especially gave promise of becoming a great helper, but I know of few instances where it can be found, and as it did not take hold of the pest as was expected, it can not be counted for much. I refer here to the steel-blue ladybird, *Orcus chalybeus*.

Another species which does much good and is a general feeder, attacking the San José scale and many other armored scales, is the brown-necked scymnus, *Rhizobius lopantha*. This species has been in California for a long time and has a good record. It is ever on the hunt for scale insects and does excellent work on the purple scale, *Lepidosaphes beckii*. I may also mention with the above, *Rhizobius debilis*, which also is a general feeder, and is generally distributed over the State. Both insects are rather small ladybirds.

A species which gave great promise in the eradication of the black scale, on account of its good work in its native land, is a steel-blue species, with red spots, *Orcus australasiae*. Large colonies of this have been liberated in the State, and for a time we could find them in the olive orchards, but I have not seen or heard of any within the last few years and it has probably died out.

Probably the parasite whose work comes nearest to that of the *Vedalia cardinalis* is the *Scutellista cyanea*, the African parasite of the black scale. This parasite in the larval state feeds on the eggs of the scale, which are deposited under it. The small, white, maggot-like larvæ can be easily found in any orchard in the coast counties of our State when the scale contains the eggs. Unfortunately, this species does not thrive in the hotter valleys, and this is probably due to the fact that the scale brood is what is called an even brood, that is to say, all scale insects mature at the same time, that egg laying is uniform, and that these conditions leave no food for future generations of the parasite. We also find that in some seasons the work of this parasite is greatly reduced, and from general observations we have found that cold, wet, spring weather, which does not retard the scale, will, on the other hand, do much to retard the breeding of the *Scutellista*, but where favorable conditions exist, we find its work as near complete as could be hoped for.

A very small parasite, which is to a certain extent a general feeder, is *Aspidiotophagus citrinus*, the yellow scale parasite. This is probably an introduced species, but when and how it came to California

has not been ascertained. It might have been introduced at the same time with its host on nursery stock. For a long time this insect had been at work without having been noticed, but finally its good work was discovered in some groves which had not been sprayed. In various sections of the State to-day this species can be found reducing the scale considerably. It also has been reared from the San José scale and other species, and can be counted on as a great help to the grower.

In this connection, I will say that very often parasites have apparently disappeared and all hope of ever seeing them again been given up. As an illustration, I might mention the little parasitic fly of the cottony cushion scale, *Lestophonus iceryae*. This species was recorded by Crawford, of Adelaide, South Australia, as one of the enemies of this scale, and several endeavors were made by him to send the same to us; in fact, this was the parasite which Mr. Koebele was sent after. At the time of the introduction of the *Vedalia* we also received this fly, but the wonderful work of the *Vedalia* so overshadowed it that it was overlooked. It can be found in many places in southern California to-day, but being of small size and its habits rather obscure, it has not been noticed, but its good work is apparent.

Another Australian ladybird which is predaceous on the cottony cushion scale, and is close kin to the *Vedalia*, is *Novius koebele*. This species was quite abundant at one time and seemed to attack the scale on broom and laburnum better than did the *Vedalia*. I am sorry to say that it has not been observed for several years, yet it might suddenly reappear; but as the cottony cushion scale is generally found in such limited numbers, the ladybird will have a hard time to multiply.

An imported species which is the enemy of several species of mealy bugs is *Cryptolaemus montrouzieri*. This species has been tried in various sections of the State, but has not been successful everywhere. In the most southern portions of the State it can be found at times in numbers and has been doing good work, yet it has not been as satisfactory nor has it done the work of eradication with us as it has in the Hawaiian Islands on the coffee. There, it is claimed, it has practically freed the coffee plantations from the mealy bug. In confinement, with plenty of food, it does fairly well, and there must be some cause which prevents its becoming more numerous.

We are fortunate in receiving one of the smallest of the ladybirds, *Scymnus vagans*, from Australia, and this species is well established in the State. It is a remarkable species, feeding on the red spider (*Briobia pratensis*), and also on other members of this family. It loves the dry, hot climate, and in this it resembles its host.

Some three years ago search was made for the enemy of the codling moth (*Carpocapsa pomonella*); the effort was successful, and we received from Europe a parasite which was reported as doing effective

work. The parasite, *Calliephialtes messor*, belongs to the ichneumons. It is quite a large insect and, when present, can be readily detected in the orchard. Many colonies of this parasite have been liberated in all the apple- and pear-growing sections of the State. After the second season we received encouraging reports of its work, and the insect had been observed in several sections on the wing. The season just past, however, has given us but little encouragement, for in sections where we expected to find the best results and where every chance had been given the parasite and no spraying done, the percentage of wormy apples was greater than in the previous years; but I may add that the codling moth has been more abundant all over the State, and the whole matter is a very puzzling problem. We can partly account for this failure. Our method of marketing our crops is somewhat different from that used in the country where this parasite was found. Here in California we harvest our apples, worms and all, and take them at once to our packing-houses or ship them into our markets, whereas in the orchards of southern Europe, we understand, the bulk of the fruit is left under the trees long enough to give the worms a chance to leave it and remain in the orchard. One can go through any of our orchards, after the crop has been gathered, and a diligent search of half a day will result in the finding of a very small number of worms. They are not there. But just go to the packing-house or fruit-drier, and look in the cracks of the floor, the wall, the picking-boxes, everywhere, and you will find the worms snugly hidden away, patiently waiting for spring to come. In other words, we are probably preventing this parasite from multiplying in our orchards because we are taking its food out of the orchards. In confinement we can raise them by thousands, and we find that in our cages very few worms escape the parasite. Here, then, is a great problem, a new phase as it were in insect parasitism—a willing insect with a limited food supply under natural conditions. Who can suggest a remedy?

California is very fortunate in having a great number of native parasites, which do much toward the reduction of her orchard pests. One of the most successful parasites, and one which has caused national comment, is *Comys fusca*, the parasite of the apricot scale (*Eulecanium armeniacum*). The parasite attacks several of our native scale insects of the same genus, and from these it has spread to the orchards, where it found a palatable food in the apricot scale. So efficient is this insect that as high as 95 per cent of the scale insects are killed by its attack. It is a true internal parasite; that is to say, the female thrusts her egg, and only one, into the body of a scale, and the larva of it devours the body tissue, leaving the body wall as a protection for the pupa. When ready to emerge as an adult, it eats its way through the top of the scale and leaves a small round hole in the derm. This is always a

sure indication that the parasite is present in the orchard. This species also attacks the frosted scale (*Eulecanium pruinatum*).

Another species which does equally good on the soft orange scale, the small larvæ of the apricot scale, and the cottony maple scale, is *Coccophagus lecanii*. This is a very useful species, and has been used to great advantage where sudden outbreaks of some of the above species have occurred. It is readily transported in the host on branches and is very prolific, reducing the scale insects rapidly, the percentage often equaling that of the *Comys fusca*.

Another native species is *Tomocera californica*, one of our best parasites of the black scale. This species, like the *Scutellista*, is an egg parasite and its larva is readily found under the host among the delicate pink eggs, rapidly devouring them. It is rather unfortunate that this species is only two-brooded, and unaided it can not keep the pest entirely reduced; but, nevertheless, it is a very great help to the grower.

Attacking some of our armored scale insects, such as the San José scale (*Aspidiotus perniciosus*), the greedy scale (*A. rapax*), the red scale (*Chrysomphalus aurantii*), and others, we are fortunate in having several minute species, probably native, and all belong to the Aphelinidæ. Among these, *Aphelinus fuscipennis*, *A. diaspidis*, and *A. mytilaspidis* are worth mentioning, as these three species are at times so prolific that some of the commoner scales are nearly, if not quite, exterminated. Especially is this the case when climatic conditions have been unusually favorable to the parasites.

A species which does much in reducing the soft orange scale (*Coccus hesperidum*), and also some of the half-grown Lecaniums, is *Encyrtus flavus*, one of our common parasites and found in nearly every locality in the State.

A very efficient parasite of the cabbage butterfly is *Pteromalus puparum*, which is also widely distributed over the entire State. So prolific is this insect that in some sections cabbage-growing is not molested by the attack of the cabbage-worm. This parasite is found in many sections of the United States, where it is also known for its efficient work on this and other pests. It attacks the chrysalis, and as many as seventy-five individual parasites have been reared from one chrysalis.

We have several small Braconids which assist in keeping down the numerous species of plant lice, so destructive to our various crops. These, together with some of our aphid-eating ladybirds, have saved a good portion of the southern melon crop this season. They were established there in large quantities and the result was very noticeable.

Of our native ladybirds I may mention the following, which have done much in reducing many of our commoner scale insects and plant lice:

Every grower knows, or should know, the twice-stabbed ladybird

(*Chilocorus bivulnerus*). This little black friend, with its two bright red spots, is a conspicuous object in the early part of February on the scale-infested limbs of orchard trees, and later in the season the peculiar clustering of the spiny-looking pupæ on the under side of branches has often alarmed the grower, who thought he had discovered some terrible new pest, only to be consoled by the report of the entomologist that they are the very best friends he has. Without question, this ladybird has done wonders in reducing the armored scales of the deciduous orchards, the San José scale, the greedy scale, the pear diaspid, and the rose scale all being eagerly sought by it and all soon reduced below the danger limit by its untiring attack.

Closely resembling the twice-stabbed ladybird is a larger species, *Exochomus pilatei*, generally known as Pilate's ladybird, which also has red spots. This species feeds on the young of the black scale and is very abundant in the olive orchards of the coast counties.

Among the aphid-eating ladybirds we have four very efficient species, the blood red ladybird (*Coccinella sanguinea*), the California ladybird (*C. californica*), the convergent ladybird (*Hippodamia convergens*), and the ambiguous ladybird (*H. ambigua*). All these species are, strictly speaking, aphid-feeders, and have done much in reducing sudden outbreaks of these pests by being transported to sections where they were destructive. They are ever busy, and on account of their bright color can easily be detected. I may mention that the *Hippodamia convergens* has the habit of hibernating near the watercourses in our mountain ranges and at this season of the year can be gathered by the bushel, as they delight in clustering like swarms of bees. Much good can be accomplished by collecting them in quantity and keeping them in a cool, dry place in tight boxes, with enough ventilation to prevent smothering during the winter. They can be liberated in spring when the first aphids make their appearance. This method has been tried in some of the big seed farms in the Santa Clara Valley, and in one season saved a large acreage of radish seed on which the aphids had started their work. The other species also cluster and hibernate in dried leaves under protected places and other material, but they are not usually found in such large colonies as *Hippodamia convergens*.

Another ladybird is the enemy of the cypress mealy bug (*Pseudococcus ryani*). This is *Hyperaspis lateralis*. It is so abundant at times that the pupæ, which are snow-white, give the tree a striking appearance. The species is a wonderful worker, and I think might be successfully used on the mealy bugs of our citrus groves. At least, it would be worth a trial.

Many of our native scale insects are severely attacked by chalcid flies. In the cedar forests we have a mealy bug which infests the red cedar and which becomes quite abundant at times and then suddenly dis-

appears like magic. From this species I have reared two very efficient parasites, and they also might be induced to take hold of our orchard species.

Here we have a new phase of insect parasitism before us. As I have stated above, *Comys fusca*, parasitic on three of our native Lecaniums, took hold of the brown apricot scale, an imported pest, showing that some species of parasites already in our State might, through transporting, be made to attack some of the injurious pests of our orchards.

In the Eastern States there are many species of parasitic and predaceous insects which would be worthy of trial. This is especially true of the aphid-eating ladybirds, of which we can never have too many species. A complete record could be kept of localities where certain parasites are known to exist and supplies of these could be collected and distributed where they were most needed. One of the most promising features of insect parasitism to-day is this very phase of the work, the transportation of parasites from one locality to another. From our wild mustard, which is attacked by a common aphid, which in turn is attacked by a Braconid species, we have been able to gather large quantities of aphid-infested material from which millions of these Braconids were reared. These were taken to the melon fields and liberated, where there was plenty of work awaiting them. The growers claim that this work has saved their crop, which they valued at \$100,000. The same kind of work can be carried on with other parasites. Very often our native shrubbery has a severe outbreak of scale or plant lice, and usually this is followed by a strong attack of parasites. Here again, material could be gathered and parasites reared and distributed where most needed. These same Braconids have saved the grain fields from destruction by the grain aphid (*Toxoptera graninum*), and I may mention in this connection that in the Western States, this last season, the grain crop was saved by the good work of these little fellows.

As an illustration of the work of some of our native parasites, I might mention the oak-moth caterpillar (*Phryganidia californica*). Those of you who live in the valley, where the live oak grows, especially in the bay counties, have observed the terrible destruction of the oaks by this pest. Fortunately for the oaks, this attack does not occur every year, and investigation has shown that the reason for this condition is that three distinct parasites, *Pimpla conquisitor*, *Chalcis ovata*, and *Hemiteles ashmeadii*, as well as a true bug, a Pentatomid, are keeping the pest in check. From a lot of pupæ of this species which I gathered in Santa Clara Valley, I reared 45 per cent of *Chalcis ovata*, besides a number of the other species. Yet, in off seasons, the prevalence of the pest would warrant the establishment of more parasites or the rearing and careful distribution of those mentioned above.

About fourteen species of *Hemiteles* are recorded in the United States as parasitic on some moth or butterfly. We can readily see that even here in our own country there are chances for investigation in the new phase of insect parasitism.

A very effective genus of this order is *Apanteles*, and there are no less than thirty-nine species recorded as being parasitic on Lepidoptera. If we had a few of these *Apanteles* species to aid our parasites, we would doubtless get some relief from the attacks of such pests as the oak-moth caterpillar.

Roughly speaking, there are about fifteen hundred species of lady-birds in the world, and by far the majority are enemies of scale insects and plant lice. Probably two hundred species belong to our country, leaving a great army of fighters to draw on, and it should be our policy to procure as many of these as we can, for all would aid in reducing our foes.

Having mentioned the parasites we have and which are doing much toward keeping our pests below the danger limit, I may mention some of our pests for which we have no efficient parasites as yet.

The vine-hopper (*Typhlocyba comes*) has caused much loss at times to the raisin men of our State, and only by clean culture or through climatic conditions have we been able to make profits. The right parasite would give great relief to the grape industry and would cause great rejoicing among the growers.

The peach-root borer (*Sanninoidea opalescens*), which is only found in a few counties of our State, is supposed to be a native insect, but in the orchards we have not yet found any parasites attacking it. This species was first found in the Sierras, and its natural food plant is probably our wild plum or cherry, and if we should find it in its native food we would no doubt find its parasite.

The cherry slug (*Eriocampoides limacina*) is a very serious pest of the pear and cherry, and should be easily kept in check by parasites, as the slug, or larva, is always exposed on the upper side of the leaf, and is therefore very accessible to an attack. A very effective parasite is known to exist in New Zealand and it would not take much to get it here.

The pear thrips (*Euthrips pyri*) is another very serious pest of the deciduous orchards and a very hard insect to combat on account of its hiding habits. It has been in the State but a few years; where it came from nobody knows, but from its habits there is a possible chance that it was brought from France with the Myrobolan seedlings. Much loss has been experienced by the prune-growers of the Santa Clara Valley, where it first made its appearance. An efficient parasite would mean much for the future welfare of the industry.

Mealy Bugs: Under this head may be included the two species generally found in the State and which have of late caused much anxiety

among the citrus growers. As stated on a previous page, we have not found a reliable parasite for these pests, but we have one in view in the Hawaiian Islands which belongs to the true flies and is about the size of our *Scutellista*.

Two other scale insects, which so far are without reliable parasites, are the purple scale and the red scale of the orange. The last sendings which were received by the State Commissioner were carefully propagated and were distributed under the most favorable conditions with an unlimited food supply, and yet, after nearly a year's waiting, we are unable to find much progress in the work of reduction. Scattering widely, as these parasites do, it may be a year yet before their presence is made manifest; we must not wait too long, however, but continue our search for other parasites, until we find the one which, with all the others, will be able to keep these two pests below the danger line.

The black peach aphid is an introduced Eastern pest, and in some sections has done considerable damage to the peach orchards. We don't know of any parasite which will keep this pest in check. We might be able to find some ladybird which will take hold of it.

The Hessian fly (*Cecidomyia destructor*) at times causes great damage to the growing grain of California, and only for the burning of the stubble and for the practice of the rotation of crops it would considerably shorten the output. Several years ago the Division of Entomology, U. S. Department of Agriculture, imported a parasite from England, *Entedon epigonus*. It might be possible to procure this same insect and liberate it in some of the infested valleys.

At times our tent caterpillars and canker-worms become unusually abundant and do great damage. As there are so many species of parasites which attack this class of insects we should endeavor to introduce those which might help to decrease them.

Tussock moth (*Homocampa vetusta*) abounds in some of the fruit sections of our State and does much damage, especially in the apple orchards. We have a few parasites, especially an egg parasite, *Telenomus californicus*, which helps to reduce its numbers; but there are several parasites which attack the Eastern species, *H. leucostigma*, and these would be an additional help toward keeping our species below the danger limit.

We can hardly expect that all imported parasites will take hold in our State, and if we succeed in getting one good parasite out of every ten, it will pay us to keep up the search. I understand that the cost of going after the *Vedalia* amounts to about \$1,500, and if we consider for a moment the enormous value of the citrus industry and what this and the deciduous fruit industry have done to build up California, I think you will agree with me that if we had spent \$150,000 we would yet be much ahead of the game. Since the advent of the *Vedalia* in 1888, this State has spent about \$50,000 in the search for parasites of

our various pests. In my estimation it is a very paltry sum for the industry which we represent; but as long as the farmer and fruit-grower, who really are the interested parties, will not take hold of these vital questions, we shall have to continue our search in a small way.

If the grower who pays taxes for every tree and vine he plants will only realize that it is he who is helping to build up the State, and that it is he who is bringing the revenue to his county and indirectly to the State treasury, by converting barren wastes into groves of luscious fruits, it ought to dawn upon him that he is entitled to some consideration at least, and I think if he will make his demands known, especially through coöperative movements, whether by the formation of farmers' clubs, protective leagues, granges, fruit-growers' associations and the like, or by other means, these important matters will be brought to a focus. I believe the day will soon be at hand when the farmer and fruit-grower can get all necessary things vital to the upbuilding of the fruit industry, including the search for and propagation of parasites on a much larger scale than we have to-day.

MR. A. N. JUDD in the chair.

MR. MILLS. I move you that this paper which Mr. Ehrhorn has just read be referred to the Committee on Resolutions, with instructions to present a resolution this evening to a fuller house, touching the necessity of appropriations for securing parasites.

The motion was duly seconded and carried.

THE CHAIRMAN. We will now listen to Mr. Cundiff's paper.

MR. CUNDIFF. Mr. Chairman, Ladies and Gentlemen: I regret very much that the party to whom this subject was originally assigned is not able to be with you and was not able to prepare the paper, because I am quite sure that he could have done greater justice to it than I; but at the last moment, almost, before leaving I was requested to present something on the quarantine aspect of our fruit interests, and I hope to be able to get it before the meeting in a very brief way.

QUARANTINE LAWS AND THEIR RELATION TO OUR HORTICULTURAL INTERESTS.

BY R. P. CUNDIFF, OF RIVERSIDE.

The enactment of laws for the protection of our horticultural interests against insect pests and plant diseases had its inception in California. The first legislation of this kind was enacted by our State Legislature in 1881. Prior to this time, little attention had been given to the enemies of fruit culture, partly from the fact that horticulture in our State was practically in its infancy, but mainly due to a lack of scientific knowledge of the enemies of horticulture. As a result, it is not sur-

prising that California should have introduced some very injurious pests.

The first horticultural laws enacted in this State were mainly designed to prevent the introduction of insect pests, plant diseases, etc., on nursery stock and fruits coming into the port of San Francisco. In 1883 the law was amended by providing for a State Board of Horticulture, consisting of nine members, who were appointed by the Governor. This board served without compensation, except a per diem during their attendance at the annual or semi-annual meetings. In 1889 the law was again amended, making it mandatory upon County Boards of Supervisors, upon a petition signed by a certain number of owners of orchards, to appoint a County Board of Horticulture, consisting of three members. The law was again amended in 1903, creating the office of State Commissioner of Horticulture.

Thus it will be seen that our State, through its Legislature, has always shown a friendly interest in what is to-day our leading industry. Every change in the original law of 1881 has been in the nature of an improvement and has shown a commendable desire upon the part of our lawmakers to give every needed encouragement and protection to our fruit interests.

Unfortunately, a number of serious insect pests had gained entrance and had become firmly established before any preventive legislation was enacted. Such destructive scale pests as the red, cottony cushion, San José, and purple, as well as a number of other injurious insects and plant diseases, had become quite firmly established throughout some of the fruit-growing sections of our State before any quarantine laws were in operation. Had the importance of these preventive measures been properly understood by our horticulturists and the necessary quarantine restrictions enacted ten or fifteen years prior to the law of 1881, there is little doubt that the introduction of many of the fruit pests that are costing large sums of money to combat would have been prevented.

But for the strict quarantine regulations maintained at San Francisco and other ports of entry of our State, it would certainly be but a short time before many other injurious pests would gain admission. Our ever increasing commercial relations with Oriental and tropical countries, where insect life is abundant and destructive, would soon add greatly to the burdens of our fruit-growers and farmers, by the introduction of other insect pests and plant diseases.

The estimated damage to agricultural and horticultural products, timber, etc., in the United States, by injurious insects and plant diseases, for the year 1904, according to the report of the U. S. Department of Agriculture, reached the enormous total of over six hundred million

dollars—a sum nearly equal to the entire expense of running the Federal Government for the same year.

The injurious insects affecting agriculture, timber, etc., in the United States, already number more than six hundred species, and new ones are continually being imported from other countries.

Is it not time that we should demand, through our representatives in Congress, a Federal quarantine law, to protect our country from this unrestricted importation of destructive enemies to our agricultural interests? It is estimated by competent entomologists that at least eighty per cent of the injurious insects of our country were imported, leaving but twenty per cent as native insects. If a national quarantine law had been enacted and properly enforced fifty years ago, it is probable that few of these injurious pests would have been introduced into our country.

It may be assumed by some that we already have all of the worst pests established in the United States. This can easily be proved to be a mistake. The eminent entomologist, T. D. A. Cockrell, in referring to injurious insects not yet reported in the United States, names seventeen varieties of scale insects affecting the citrus, eight affecting the apple, pear, and plum, seven affecting the grapevine, five the mulberry, seven the olive, three the cotton plant, and six the sugar cane. The above list is composed of scale insects and classed as extremely destructive. Professor Cockrell states that any of these pests are liable to be introduced into the United States at any time, unless a very effective system of quarantine is maintained. In addition to this list of scale insects, liable to be introduced at any time, can be added the Morelos orange maggot of Mexico, the melon maggot of the Hawaiian Islands, the Mediterranean fruit flies from Australia, as well as many other injurious insects and plant diseases.

What would it have been worth to the great pear districts of the San Joaquin and Sacramento valleys if the pear blight could have been kept out? This disease was undoubtedly introduced in shipments of nursery stock from some of the Eastern States.

Should the disease known as peach yellows become established in our State, the same sad fate would befall our peach orchards. During the summer of 1890 the writer made a trip through what had been the greatest peach-producing district of the United States, the State of Maryland. A few years before, the yellows had made its appearance in that district and the dead stumps covering hundreds of acres of what had once been the most productive and profitable peach section were the only sad sentinels left of this once famous peach district.

During our thirteen years of service on the horticultural commission of our county we have come to know and thoroughly appreciate the great value of a rigid enforcement of quarantine regulations for the

protection of our fruit interests. The pests we keep out can do us no harm. The old adage, "an ounce of prevention is worth a pound of cure," can be applied with a tenfold greater meaning to protecting our fruit interests. No insect pest, once thoroughly established, can ever be eradicated by any artificial methods such as fumigation, spraying, etc. We are, however, compelled to resort to these expensive methods to prevent loss of fruit and destruction of trees.

Where we have been fortunate in securing nature's checks in the way of predaceous insects and internal parasites our burdens have been considerably lessened.

The State quarantine office maintained at San Francisco, under the supervision of the State Commissioner of Horticulture, is doing a great work in the way of preventing the further introduction of dangerous insect pests and plant diseases. While we thoroughly appreciate this most valuable work of the State Commissioner, we realize that it is only through a thorough and complete coöperation with the County Boards of Horticulture that the greatest benefits can be derived.

It is certainly an injustice to hold the State Commissioner responsible for the introduction and spread of fruit pests over our State, unless he is provided with the proper authority to compel the necessary precautions to be observed by the county horticultural officials. We believe the State Commissioner should exercise a general supervision over the appointments of county horticultural officials. We are all aware of the fact that quite a number of fruit-growing counties of the State have neglected or refused to appoint horticultural commissions. Other counties through their Supervisors have appointed to these positions men who were utterly devoid of any experience or other qualifications for the work, but merely as political or personal rewards. Again, other counties have appointed efficient men, but have curtailed their expenditures to such an extent that it was impossible for them to do effective work. These abuses should be promptly remedied. A very general sentiment appears to exist among the growers to have the present horticultural law amended to provide for a County Commissioner of Horticulture instead of a board of three, as at present exists. We believe that such a change would be of great benefit and should result in a greatly increased efficiency over the present system. By limiting the commission to one man we believe some of the present political features would be eliminated. Especially would this be true if the law should compel the applicant to secure from the State Commissioner a certificate as to his fitness for the position before receiving the appointment from his county. Such a law should insure the appointment of competent men. The law should also provide that in case such commissioner proved to be incompetent or careless in the discharge of his duties he should be removed, upon the request, in

writing, from the State Commissioner, presented at any meeting of the Board of Supervisors of his county. The appointment should be made for a term of four years, subject to the present provisions of removal for cause. The compensation should be changed from a per diem to a monthly salary. The salary should be regulated by the extent or importance of the horticultural interests of each county and incorporated in the county government act of any county appointing such commissioner. The commissioner should have authority to appoint such assistants as the demands of his department required.

We are convinced that such a change in our horticultural law would secure a much more efficient service than is possible under the present system.

Our horticultural interests far exceed those of any other state in the Union, and surely an industry producing an annual income of more than \$60,000,000 should be entitled to the greatest possible protection.

MR. MILLS. I move you that this paper be referred to a committee composed of the chairman, Mr. S. A. Pease of San Bernardino, and Mr. Cundiff, to draft a resolution along the lines therein set forth, the committee to hand the resolution to the Committee on Resolutions, to be presented to-night.

The motion was duly seconded and carried.

THE CHAIRMAN. The next paper on the program is a composite one and has been contributed by the different Inspectors of Los Angeles County. Each of these men is an expert in the matter he handles, and all have had a wide experience in fighting scale and other pests, and I have no doubt that this will prove one of the most valuable of the papers presented this morning. Mr. Secretary, will you please read the paper?

ORCHARD PESTS, AND THEIR TREATMENT.

BY THE LOS ANGELES INSPECTORS.

RED AND YELLOW SCALES.

All citrus fruit trees are subject to red scale infection. Lemon and grapefruit, however, seem to be the ones most preferred by this scale insect, and the lemon tree or orchard is usually the center of the red scale infection of a district. We have no parasitic insects that in any degree control this scale, and for this reason are obliged to depend upon spraying or fumigation for control or eradication. In parasitical experience spraying has been proven a failure. The result of continued spraying for successive years has been a gradual increase and spread of the red scale infection.

The hydrocyanic acid gas treatment has been the most successful.

The dosage for red scale is usually from one third to one half more than for black scale, the tents to be kept on the trees one hour. Where thorough work is contemplated for the eradication of the scale, the dosage should be double that for black scale and the tents should remain on the trees one hour and a quarter, using three and one half parts of water to one of cyanide. All low-hanging limbs touching the ground should be removed and all drop fruit on the ground should be destroyed, as near the ground the gas is not so effective.

The red scale is always in condition for treatment, but the treatment is usually timed to include the black scale. With ordinary dosage thousands of the scale in all stages will be destroyed on a tree, but for reasons we can not explain an occasional scale escapes the treatment and furnishes the basis for future infection. On account of this result the double dosage and extended time of covering are recommended for thorough work.

Yellow Scale.—Yellow scale very much resembles the red species, but differs in color and habit. The red scale infests the fruit, foliage, and wood, even to the old wood of the tree. The yellow scale infests the fruit and foliage only; specimens of this scale are not commonly found on the wood. The yellow scale largely infests the seedling orange tree, and we find there the heaviest infestation. Another fact that seems to emphasize the correctness of the belief that the yellow scale is a distinct species from the red scale is the fact that the Golden chalcid fly and other parasitic insects keep the yellow scale under fair control, in most cases treatment not being especially required for this scale, but occasionally treatment is required when the parasite enemies temporarily fail to hold it in check. In such cases the same treatment is to be recommended as for red scale.

The yellow scale seems to be fully as hard a scale to destroy by spraying or gasing as the red.

C. A. DAY.

LIFE AND HABITS OF PURPLE SCALE.

The life of this scale varies from 75 days in summer to 120 days in winter.

The female scale begins to deposit eggs at the age of 40 days. The number varies from 25 to 27 eggs. Then her life is ended. The period between the time the eggs are deposited and time of hatching is controlled by weather conditions and may be from 35 to 70 days.

Continued warm weather hastens their growing life and shortens the time of incubation of eggs. Cold weather has a reverse effect, not so much in growing life as in time of egg incubation.

This scale produces four broods during the year, the hatching of which is governed to such an extent by the weather conditions that it would be difficult to determine within 15 or 20 days of the time hatches

take place. The general hatches occur from April 15 to May 15, June 15 to July 15, August 15 to September 15. These times vary as the weather varies.

The habits of this scale confine it strictly to citrus trees. They prefer the most sheltered part of the tree, or the side that gets the least sun.

The injurious effect on the trees is very marked. The feeding of the scale on the leaves and branches has a poisonous effect, causing the badly infested branches to die, especially after the colony has become very numerous, as it surely will if not checked.

While this scale is slow to breed as compared with some, a large percentage of them mature. There are but few known parasites that prey upon them. This scale thrives and flourishes best near the coast. Heat and a dry atmosphere, like the summer weather in the San Joaquin Valley, soon destroy them.

From numerous experiments conducted by the Horticultural Commission and Inspectors of Los Angeles County, made within the last eighteen months, we find it is possible to destroy the purple scale in all stages by fumigation with heavy doses of hydrocyanic acid gas, and as this scale is confined to citrus trees only, it is possible to make a complete extermination of them.

WM. WOOD.

QUARANTINE.

The inadequacy of the present law, in regard to a proper protection against the introduction of pests dangerous to our fruit and plant interests, can not be more forcibly illustrated than by calling attention to the various points in our State that have recently been ravaged by the white fly (*Aleyrodes citri*).

The failure on the part of the authorities to provide effective quarantine in these as well as other portions of the State has made it possible for the introduction and spread of this most dangerous of insect plagues.

The inefficiency of the postal laws governing the transmission of plants and trees through the mail is the most serious drawback to proper control with which we have to contend; the rules laid down for the sending of immoral matter, letters with fraudulent intent, or for black-mailing purposes are exceedingly effective. This would seem to establish the fact that when the moral or material welfare of the people is threatened the law is sufficiently elastic to govern in the premises. However that may be, under the present conditions an inexperienced or careless nurseryman from any part of the United States may send the most dangerous of scale or other infested plants and trees to any point with impunity, where they by diffusion could work ruin to many of the great industries of the State, despite the Boards of Horticulture or local laws.

Los Angeles County, through the persistency of its Horticultural Board, has been enabled to enlist the coöperation of the railroads and express companies in the work of excluding injurious insects and plant diseases, and by systematic and continued insistence has obtained control of every shipment of freight or express matter appertaining to plants or trees that comes into the county, and every such consignment before it is allowed to be delivered undergoes a thorough and intelligent examination by competent and experienced inspectors, thus insuring absolute freedom from plant disease. Our city to a great extent is a gateway to possible infections, and more particularly so from the fact that of recent years there has been a great influx of wealthy people who are creating fine gardens and filling them with rare and costly plants from every quarter of the globe, making the closest scrutiny a necessity because of the greater extent of territory from which infectious plants are brought.

It is claimed that the postal laws are sufficient to cover the point aimed at, namely, making it the duty of all postmasters to inform the County Board of Horticulture, or its inspectors, of the arrival of mail containing plants or trees, and holding the same until they have been inspected; but at best the law on the subject is ambiguous, and only by questionable procedure can it be construed so as to meet the requirements. An amendment to the quarantine laws should be submitted making it imperative that postmasters should notify the horticultural representatives of the arrival of mail from a quarantined locality before its delivery to the consignee. The attention of our representatives in Congress should be called to the matter and their active coöperation enlisted.

That the subject of quarantine is of paramount importance has been demonstrated in Los Angeles County beyond a reasonable doubt. For three years the officers of the Board of Horticulture have been destroying plants from Florida, Louisiana, and other dangerously infested localities, all of which were found to be more or less infested. Many of these consignments were of considerable value, one of them estimated to be worth \$100; but the Board insisted on their destruction, and they went up in smoke. To this rigid adherence to the rules is ascribed our present immunity from the white fly.

E. J. NILES.

CITY INSPECTORS.

In the assignment of topics given to the various members of the Los Angeles County horticultural force, the woes of the Los Angeles city inspector was allotted to me, and if the trials and tribulations of a number of years' experience are to be considered, and that qualification alone, the task has been placed properly.

We have it arranged with the three railroad transportation companies, also with both electric roads and Wells, Fargo & Co., not to deliver to any consignee plants or trees without a release from the Horticultural Commissioner, and either before or at once after said release they are carefully examined for any possible insect pest or disease.

If these plants or trees show to have been sent from a section under the ban of our quarantine regulations, the plants are sent at once to the office of the Horticultural Commission, where summary action is taken, the same being as a rule perfect incineration in the court-house furnace. If the shipment consists of trees from any objectionable portion of the State or from other states, they are closely examined and treated according as scale or disease may manifest itself—sometimes by fire, sometimes by fumigation.

The chief source of dangerous importation of dreaded insect pests is by means of United States mail service. This latter source of conveyance may baffle our most diligent and careful attention, from the inborn perversity of some person, or the want of a full appreciation by the importer of the probable loss and injury to our fruit interest, by even one small lot of plants from a Florida nursery infested with the dreaded white fly. Thus far, I believe, only one lot of plants by mail from Florida has gotten away from us, and that one has been under constant surveillance during three years. All the others, six or more, were destroyed. There have been a number by express, but these have always been carefully inspected. Every lot and parcel of trees and plants are inspected on arrival in the city, also reinspected before they can be shipped away again. This course is always followed between any two of our inspectors if in different portions of the county. With all this watchfulness it can readily be understood that we are always fearful that something will escape our scrutiny.

The lover of the human race can not very well understand how any person can deliberately be the agent to work such trouble, loss, and injury as an infestation of the Florida white fly would cause our orchardists if a colony should once become thoroughly established, still we have continual proof that at least one nurseryman in Florida has sent scale-infested plants to this section, and if their present attitude is any evidence of their future intentions will continue to do so, and over the State, so long as they can find some one in California to patronize them.

To give additional weight to the city inspector's troubles, we have about 1,500 fruit and vegetable wagons, with fruit stands scattered at many points over an area of from ten to sixteen miles. If one of those should be found with scale-infested fruit the question at once arises, where are the inspector's eyes. To fully understand what is expected

and required from him, let me also state that we have about forty nurseries and salesyards, with at least twenty of them controlled by Japanese, who are decidedly opposed to any effective means to clean their premises of scale pests. With these conditions existing, a certificate stating a shipment of plants is believed to be clean, and a lonesome mealy bug in the cavities of the top of a dracena crawls up into view, a specimen of red scale on the under side of a camphor tree overlooked, the development of some eulecanium hidden under a fern leaf is made manifest in transit or afterwards, a howl at once goes up against his unfortunate head by both customer and inspector at point of destination.

A. T. GAREY.

ERADICATION OF THE MEALY BUG IN THE CITRUS ORCHARD.

During the last ten to fifteen years the mealy bug has steadily gained in numbers and extent of territory in the citrus groves, and especially in the Navel oranges. While the spread is slow, it seems sure, as all the ordinary means used to check its progress have signally failed. There are many sprays that will kill both the mealy bugs and their eggs, but all sprays that use water for the greater part of the mixture do not readily penetrate the mass of cottony fuzz of the old ones and the eggs therefore derive almost no benefit from spraying except with sprays of pure alcohol or oil. The alcohol is too expensive except for small plants, and the oil is too severe on the trees. Fumigation as done by the common method, even when an extra heavy dose is given, only serves to check them for a few weeks; the gas fails to penetrate into the larger masses of eggs, and the result is that in about three weeks the mealy bugs are quite numerous again.

The method here described is the method of many experiments, and is the best practice and only one that has completely eradicated the mealy bug from the citrus orchard so far as is now known.

The best practice is to fumigate with a large dose, usually double or a little more than the ordinary, say from a pound to a pound and a half to an ordinary Navel orange tree, using about four times to four and a half of water, and leaving the tent, which must be a good one, on all night. If the mealy bug has not formed any large masses, this will generally give complete killing, provided the ground is free of weeds.

The next best time is to fumigate just before picking the fruit, which should be picked the next day, and all, even those poor oranges on the ground, removed or treated with coal oil or distillate; this has given very good results where carefully done.

Perhaps the least desirable but equally successful method is to fumigate all night with heavy dosage and slow firing as in the first method, and the next day treating the large masses of bugs and eggs by hand

with either coal oil or alcohol from a small machine oil can, holding the Navels up to secure complete killing, repeating on the trees where there is return of the trouble.

Any and all of these methods have been completely successful, there being no return of the mealy bug after two years where the orchards are free of weeds. But if there is much growth of weeds under and about the trees there is but little hope of complete success.

All of these methods are too slow, and require constant watching for some months afterwards, and are rarely successful except where the number of trees are few, or the owner of the orchard is willing to give much time and attention to the job. The results are that in most of the orchards where they have gained a foothold they are slowly spreading, and unless we can secure some parasite for the mealy bug which will keep it completely down, the time is not far distant when a large number of the citrus orchards will be completely infested with them. There are many parasites which work on the mealy bug in the orchards, and at times very nearly exterminate them, but none of them, so far as known, keep them down for more than a few months, or possibly a year, the insects always returning and generally to the very same trees.

C. B. BLAINE.

NURSERY STOCK.

The raising of citrus nursery stock in this county is one of the most important industries, and the inspection of nursery stock is one of the duties to which the Commissioners and Inspectors devote a large part of their time during the planting season, the interest of the citrus industry of the future depending largely on their knowledge and careful inspection.

The method used in this county mostly, by the nurserymen under the supervision of Commissioners and Inspectors, we believe to be very successful.

The nurserymen, during the season that black scale are in condition to kill, now almost universally use fumigation in the nursery bed. Then during the shipping season dig their trees and place in lath houses in lots of five hundred to six hundred, fumigating the second time for black scale.

If any other than black scale is found, the same method is gone through, with increased amount of cyanide to do the proper work, and, if found necessary, the trees are defoliated.

In placing citrus stock in lath houses, if any red spider is found we find that the best way to treat trees is to defoliate them and hand scrub with whale-oil soap or resin wash.

CHARLES NORTHCRAFT.

CONTROL OF SCALE PESTS IN SUBDIVISIONS.

My article is necessarily very brief, simply in relation to control of scale pests in subdivisions.

With the great demand for building lots in desirable locations, a large number of lemon groves in Hollywood, my district, have been purchased for subdivision, and as a result of neglect to properly treat the trees thereon, they in time have become badly infested with red scale. To eradicate this pest, and thereby protect adjacent orchards, a universal system of notices issued by the Horticultural Commission and served by the Inspector upon each individual owner has been adopted, with the result of a thorough fumigation over the valley, and a complete clean-up. To date, about twenty thousand lemon trees have been fumigated under forcible procedure. This has required eight hundred notices.

L. M. MAYET.

FUMIGATION WITH HYDROCYANIC ACID GAS.

Fumigation of citrus trees and nursery stocks with hydrocyanic acid gas as a means of insect control has now reached a degree of efficiency, when conducted by competent and careful men, as to surpass all other artificial means to this end, at least in the southern part of the State, where almost constant warfare has been pursued against black scale infestations. Until recent years results obtained by this method of treatment were so variable (owing to the want of accurate knowledge of the process) as to invite the trial of many other methods in competition. The most popular of these was the application, by means of high-power spraying machines, of distillate mixtures. It was claimed for this latter process that it was much cheaper than fumigation, and that it would by the single treatment destroy not only the scale pests, but also the citrus mites, whereas the latter were but slightly affected by the fumigation. So popular for a time did this spraying process become that fumigators were put practically out of the business, especially as they attempted to compete in prices with the sprayers by reducing the amount of chemicals used in fumigation, thus bringing the latter process in still greater disrepute. The better practitioners, however, by increasing their dosage and perfecting each detail of the work, soon demonstrated the fact that one perfect treatment by fumigation was not only cheaper but more effectual than two treatments by the spray methods, while the citrus mites, where they did occur rarely in threatening numbers, could be effectually controlled for two cents or three cents per tree by the sulphuring process. It also became apparent that actual damage to trees and fruit by the application of the distillate sprays was reaching into the hundreds of thousands if not millions of dollars, and that just the opposite effect was produced upon

tree and fruit by fumigation. The latter process is now in almost universal use throughout the orchards of the south and betterment of fruit and trees has been most marked.

Fumigation, however, is still far from an exact science and results are not so uniform as they should be, depending largely upon the degree of intelligence and reliability of the operators.

A new significance has been given to the use of cyanide fumigation for insect control, by a practice originating with the Los Angeles County Commissioners of Horticulture and used extensively since that time (November, 1904) for the extermination of the more resistant scales, like the purple and the red scales. Up to that date these two pests had been fought with all sorts of applications for a period of at least sixteen years, without a single instance of entire eradication, so that the saying passed into a proverb that "once red scale always red scale," and the purple scale, though not so well known, came to be considered in the same class. It had become the common practice to treat these scales by repeated fumigations, at intervals of about two months, with the dosage commonly used for black scale, proceeding upon the theory that the successive broods of young while yet in their tender stages could thus be killed and finally total eradication take place. This method proved to be exceedingly expensive, prohibiting all profit from the infested grove, and continued the nuisance indefinitely. Any one familiar with these scales knows that they have no well-defined periods of breeding, at least none which involve the whole mass of the infestation, but that these masses consist of all sizes and conditions of scale, some portions of which will be an egg-forming stage at almost any given time. In the case of the purple scale these eggs are not killed by ordinary cyanide dosage, but hatch out later to reinfest the tree, while in the case of the *Aspidiotus* scales (which do not produce their young from eggs, properly speaking) there are at any given time mature specimens in any considerable infestation which have passed the stage when this light dosage will kill them, and these will reproduce their successors after the treatment of the tree. With this view of the subject in mind, it was conceived that any process of treatment for these resistant pests which offered any hopes of their eradication must be effectual in destroying, at one time, the entire infestation, including the eggs, in the case of the Lecaniums.

Increased dosage and lengthened exposure by the cyanide process have proven the easy solution of the problem, and it only remains for the fumigators to become proficient in the use of this heavy dosage to bring it into general use, nor is this proficiency difficult to acquire. The universal belief that the limit of safety had been reached (or nearly so) in the so-called full or killing dosage used for black scale, and that any material increase of the chemicals must destroy or greatly

injure tree or fruit, has been proven to be erroneous, as double this amount of chemicals has been repeatedly used upon a commercial scale during every month in the year, without injury to tree or fruit (except in a few instances where some of the fruit in its young stage was injured), and for experimental purposes as much as two hundred per cent has been added to the strength of the first named formula, with no injury to tree or fruit. Doubling the old formula, however, seems to be perfectly effectual for entire eradication of purple scale and red scale, and some tests made have seemed to indicate that slightly less cyanide was effectual upon the red scale. So far as demonstrated in the work of the Los Angeles Commission, one and one half to two hours' exposure to the gas is necessary. A slight addition is made to the proportion of water used to dilute the acid and retard too rapid generation of the gas, but it should not exceed three and one half parts of water to one of acid. This, with many other phenomena presented by the practice of this method in the district where it originated, together with the added importance given to the whole subject of insect control by the very exhaustive investigations made by Professor Powell of the Department of Agriculture at Washington, in which he clearly proves that only clean fruit is profitable, moved the then Secretary of the Los Angeles Horticultural Commission to try to bring about a scientific study of the whole process of cyanide fumigation on the part of the Department of Agriculture at Washington. This movement was taken up by the Los Angeles County Commission, and, with the hearty coöperation of the commissions of other counties and of many large citrus associations, an appropriation of \$5,000 was secured from Congress for the purpose, and Prof. C. L. Marlatt, assisted by Professor Woglum, has already inaugurated the work in Los Angeles County, and the whole subject will be fully exploited, covering such points as life of eggs, periods of light and heavy doses, its generation, killing effect, pressure of gas, different proportions of water used, margin between efficiency and danger to tree and plant, external conditions, light, heat, moisture, etc., quality of materials, physiological effects upon tree and fruit, and many other important features not known to commercial fumigators. It must be understood that treatment requiring such excessive amounts of chemicals should not be undertaken when natural conditions are not favorable, such as periods of excessive moisture, or during daytime. Both cyanide and acid must be of good quality, the former not too finely powdered, unless two or more generating pots are used to each tree, and every detail of the process must be carefully handled, but with such care that there need not be the least injury to the tree, even when three times the amount of cyanide used for black scale treatment is used. And needless to say, no scale pest has survived such treatment.

One of the accidental discoveries made in the use of this double dosage late in the season (from January 15th to the middle of the bloom period) was that excessive crops of high-grade fruit followed upon each of the scattered groups treated, while in many cases the untreated trees adjoining these groups bore that year extremely light crops, and this occurred in so many orchards as to seem to prove that the excessive crops were due to the stimulus given to the trees by the fumigation during the critical fruit-setting period.

The time now seems ripe for a general supervision of all jobs of fumigation done in each county by the Horticultural Board of such county, whether the work is done by private contractors or otherwise, and to this end all Horticultural Inspectors, as well as Commissioners, should make themselves familiar with all the details of the process, and especially with the scheduling of the trees, so that they may regulate the amount of dosage used, and thus safeguard the interests of the fruit-growers in whose service they are employed. The orchardists should be prevented from inviting poor work by exacting too low a price from the contractor, and on the other hand, any unscrupulous or ignorant fumigator should be prohibited by the Commissioners from using too small an amount of chemicals, or too short a period of exposure to the treatment to insure the best of killing results. I believe this regulation of a practice which costs the fruit-growers hundreds of thousands of dollars per year to be well within the province of our Horticultural Commission, and that ample authority is vested in such Board by our present laws.

C. E. BEMIS.

A recess was here taken until 7:30 o'clock P. M.

EVENING SESSION—THIRD DAY.

THURSDAY, December 5, 1907.

Owing to delay in the return of the excursionists, the meeting was not called to order until 8 o'clock P. M.

Commissioner JEFFREY in the chair.

THE CHAIRMAN. While we are waiting on the audience to assemble—and we can not proceed very well until they get settled down—I will ask Mr. Filcher to make a five-minute talk on the Alaska-Yukon Exposition. Mr. Filcher is too well known in California to need an introduction from any one.

ADDRESS ON THE ALASKA-YUKON EXPOSITION.

BY J. A. FILCHER, OF SACRAMENTO.

Mr. Chairman and Ladies and Gentlemen: I believe my name is on the program for a short affliction to-morrow. Being pretty busy, I just arrived in Marysville this evening, and I want to thank the President for the opportunity to say a few words to you on the subject of his suggestion, because I had it in my mind when I got up to-morrow to tell you. It would be more fitting, I suppose, that I should talk to you about the State Fair or the Exposition than about peaches.

The Governor has seen fit in his wisdom to name me as his representative at the Alaska-Yukon Pacific Exposition, which is to be held in Seattle, Washington, beginning the first of June, 1909. You may think the appointment is early, but it is not. Experience has shown that it will require a little time to get the people acquainted with what is expected of them, and it requires one year's good work to assemble a creditable representative exhibit of California's resources. You will all, as Californians, agree with me that it is incumbent on us, whenever we attempt to make an exhibit, to make a good one. I remember it was said in regard to Portland that the fair, being of secondary character and importance and neighboring, it was not necessary for California to spend much, but that it would be sufficient for the purpose to make a little exhibit. I remember I replied to that, that California had a reputation to maintain and that it were better for California not to attempt any exhibit at all than to make a poor one. That idea we maintained and we did make at Portland a good exhibit. It is probably not becoming for me to say it, but I will say that we were far ahead of any State exhibit at that exposition, and, surprising to me, we received more direct and indirect benefit from that exhibit than perhaps from any exposition we have ever exhibited in, and I think I am competent to judge. It has been my misfortune, I guess I ought to say, to represent California at eight expositions—six in this country and two in Europe—and I have been particular in noticing the results of those exhibits. Before the Portland exposition there was in the Northwest what amounted to almost a deep-seated antipathy to California. Whether or not it was prompted by jealousy I do not know, but we saw it and felt it in the air when we got there and we read of it in the papers. I remember a terrible tirade coming out in the *Oregonian*, soon after our arrival in Portland, against some manufacturer who was buying crude oil in California and allowing Oregon slab-wood to rot in the yard—simply to show how jealous they were of sending any money here. At a banquet early in the session Governor Chamberlain of Oregon made a speech and all his references were to the

great Northwest. I met him soon afterwards and he asked me what I thought of his speech. I told him it was a good speech from an Oregon standpoint, but it demonstrated that he was a much smaller man than I thought he was. Of course, I said this in a very good-natured manner, and he said to me, "How is that, Mr. Filcher?" I said, "In all your references you said 'the Northwest' and 'the great Northwest.' I should think, as Governor of an exposition State, that you would be broad enough, on an occasion of this kind, to say 'the great West.' California is in this area, and yet by inference we were never referred to." He tapped me on the shoulder and said, "I stand corrected," and promised never to say it again, and I don't think he ever did. At a function soon after that it was my fortune to have a chance to talk to some of the Oregonians and I referred to this undercurrent of jealousy or suspicion, and I told them that for a while I didn't know the cause of it until finally an old gentleman came to us one day and said, "Here, my friend, are you from California?" I said, "Yes, sir." "Well," he said, "I want to ask you a question. Is it a fact that you Californians are going to take Portland back with you when you go and attach it to Golden Gate Park as a rose garden?" I said, "Why, my dear sir, no. We are going to help Portland expand and plant a few more roses." "Is that really so?" "Why, of course it is. We don't need Portland; we have got roses enough of our own." He said, "You are not going to take Mount Hood with you?" "Of course not. We have got Mount Whitney and Mount Shasta, and we don't need it. Instead of taking it we are going to help you roll a few stones upon it and make it grander and higher and more attractive than it is now." "Well," he says, "by jolly! that is the way to talk."

But to come to the point. We did work, and we found generous coöperation, to try and infuse a more friendly feeling and to expand the idea and cement the thought that we are part of a great commonwealth, the great important factor of the trans-Rocky Mountain country, the country on the continent and in the world that offers more for exploitation to-day than any other place on the globe, and we can be one people for one purpose, and we think we had a good deal to do in establishing that idea and confirming it, for following that exposition there was a better feeling engendered. The Oregonians and the Washingtonians began to come here in greater numbers than ever before, to spend their winters, and Californians have gone into the Oregon mountains and rivers to spend their summers. Our trade has increased one hundred per cent, as shown by figures and statistics. We are going right after you in the effort to duplicate this work and to increase it at Seattle in 1909, and when we come we want you to help us with the best products you have got.

The Secretary at this point read the following telegram:

LOS ANGELES, CAL., December 5, 1907.

Citrus Fruit-Growers' Convention in Session, Marysville, Cal.

The California State Realty Federation wishes your coöperation toward inducing the use of the best quality of fruit locally at a lower retail price, especially by the leading hotels and restaurants, where present charges arouse criticism and discourage consumption by tourists.

HERBERT BURDETTE,
Executive Secretary.

REPORT OF SPECIAL COMMITTEE ON RESOLUTIONS.

MR. JUDD. Mr. President, the committee appointed to-day to draft resolutions covering some legislative matters that were mentioned in the various papers, reports that the resolutions are ready, and I will read them:

Resolution Favoring a Quarterly Convention.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of the Fruit-Growers' Convention:

WHEREAS, The vast area and diversity of the fruit industry of California have developed problems regarding each variety that it is impossible to properly consider at any one convention; and

WHEREAS, Each variety has its own peculiar interests, and in the production of each are engaged many who would be pleased to have devoted at least one week to their particular subjects; and

WHEREAS, Our present system of an annual convention has become unable to give full attention to any one branch of our great industry; and

WHEREAS, A manifest economy of time and distance could be had by members if a quarterly convention could be had, dividing the industries with the territory, to the end that less papers, less subjects, and more and adequate time could be had to solve the special problems pertaining to each industry; therefore, be it

Resolved, That we request the President, in his requests for more liberal support from the State, to take this subject into consideration, in order to crystallize the energies of each department to the betterment of the whole.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Favoring Increased Appropriation for Insectary Purposes.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, The efficiency of parasites in the destruction of pernicious insects is well known as being of great value to the fruit industry of California; and

WHEREAS, At present there are insufficient funds for the proper support of the State Insectary and for introducing from the home of these pernicious scales and insects their natural parasites, as well as for the propagation and distribution of the same; therefore, be it

Resolved, That we, the fruit-growers in convention assembled, earnestly request that sufficient funds be set aside for such purposes, the same to be at the disposal of the State Horticultural Commission.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Favoring National Horticultural Quarantine.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, The national laws on importation of insect pests for the proper guarding of the fruit interests of this great nation, which in California alone are worth over sixty million dollars (\$60,000,000), are inadequate; and,

WHEREAS, A thorough coöperation of Government quarantine officers on the Atlantic coast with the California Horticultural Commission is desired, to the end that the Pacific Coast may be further protected; therefore, be it

Resolved, That a copy of these resolutions be sent to each representative from California, in the Senate and House of Congress.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Requesting the State Commissioner to Draft a New Horticultural Law.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, The present law regarding the fruit industry of California has, owing to the greater demands and necessities of the industry and owing to the enormous increase of the territory as well as acreage, become complex and often inoperative; and

WHEREAS, Amendments, simplifying these laws, to the end that greater efficiency as well as an increase in power should be had; therefore, be it

Resolved, That the President of this Convention be requested to draft such bills as seem to him best to bring about the desired results; and be it further

Resolved, That the President appoint a Legislative Committee, whose duty shall be to attend, and vigorously urge, before the various legislative committees the relief asked for.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Asking for More Effective Horticultural Quarantine.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, There are insufficient funds at the disposal of the Horticultural Commission of California to properly quarantine the State on the north, south, and east against the importation, by accident or otherwise, of the many injurious pests that mean destruction to our greatest industry to the value of an annual output of sixty million dollars (\$60,000,000), if not prevented; and

WHEREAS, Prevention means great economy to the taxpayers of California; therefore, be it

Resolved by the Fruit-Growers of California, in Convention assembled, That sufficient money be appropriated to give the adequate relief by employing additional quarantine officers to strenuously and efficiently guard all our borders.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Favoring Increased Appropriation for the Horticultural Commission.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, Recognizing the inability, owing to the lack of proper funds, of the State Horticultural Commissioner to make his office the head of the fruit industry of this State; and

WHEREAS, Among his prescribed duties he is ex officio member of all County Horticultural Commissions of this State, to the end that his office should be the help and guide to the Commissioners; and

WHEREAS, Frequent meetings with these Commissions would greatly enhance the value of his office and the service by keeping the various Commissioners in touch with the best and most rapid method of protection to our industry; therefore, be it

Resolved, That we, the fruit-growers of California, in convention assembled, most earnestly request that the Legislature of California make a large increase in the annual appropriation for the State Horticultural Commission, to the end that an added efficiency may be had.

Respectfully submitted.

A. N. JUDD.

S. A. PEASE.

R. P. CUNDIFF.

MR. JUDD. I move that these resolutions be referred to the Committee on Resolutions, to report to-morrow morning.

The motion was duly seconded and carried.

REPORT OF COMMITTEE ON THE PRESIDENT'S ADDRESS.

Mr. Judd, as Chairman of the Committee on the President's Address, then read the report of the committee, as follows:

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

GENTLEMEN: We, your committee appointed to consider and report on the annual address of the President of this organization, respectfully report as follows:

We find the President to be in hearty accord with the broad policies of his illustrious predecessor, whom he so generously eulogizes, thereby voicing the sentiments of the fruit-growing world.

We approve his hearty coöperation with the State University, making the office of the Horticultural Commission a medium to applaud its success as well as to favor its policies.

We note with the highest commendation his recommendations for more liberal appropriations by our Legislature to advance the greatest interest of California by strengthening the quarantine service. We are happy to note that our President is in sympathy with all the previously expressed reforms of former conventions in the matter of reduced rates, quicker and better car service, as well as adequate labor supply.

He pays a compliment that becomes no less a tribute to our retiring President, when he expresses his loyalty and faith in the natural as well as the artificial methods of pest control.

In calling special attention to these specific points in the address of President Jeffrey, we desire to commend the entire document as timely, progressive, patriotic, and valuable, and worthy of the thoughtful consideration of all our people. We further indorse our worthy President's suggestions advocating amendments to

present laws, which would fully protect us from incoming pests, and the passage of new laws to put the Commission in an independent position, giving it compulsory power to the extent that adequate protection may be had by all fruit-growers of the State.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
E. BOOTH.

MR. JUDD. I move the adoption of the report of the committee.
The motion was duly seconded.

MR. JUDD. Owing to the delicacy of the President, I will put the motion.

The motion was unanimously carried.

PROFESSOR WICKSON submitted a proposed resolution, which was read by the Secretary, as follows:

Resolution of Regard for Hon. Ellwood Cooper.

Resolved, That this the Thirty-third Convention of California Fruit-growers desires to place upon record its appreciation of the eminent services of Mr. Ellwood Cooper, who for more than a quarter of a century has labored devotedly for the advancement of California horticulture, and whose name is closely connected with all phases of effort for commercial and cultural promotion and protection which have prevailed during that period. These services assure Mr. Cooper an enduring and honorable place in the history of California and entitle him to look forward to such reward as a recognition of his public worth and disinterested labors.

Resolved, That the Convention rejoices in the fact that Mr. Cooper retires from the public service full not only of honors but of physical and mental health, which encourage the hope that his effective participation in our horticultural affairs may be continued for many years.

THE CHAIRMAN. What is your desire—to have that referred?

PROFESSOR WICKSON. The regular course.

THE CHAIRMAN. I believe I will just take the liberty of asking for a vote on that resolution right now. Will you make a motion to have that resolution adopted?

MR. BERWICK. I move to have it adopted.

The motion was duly seconded.

THE CHAIRMAN. I hope every one in the house will vote on this.
The motion was unanimously carried.

THE CHAIRMAN. Now, if there is nothing else to come in, we will proceed at once with Mr. Mills's lecture. I will say that after Mr. Mills's lecture is over he will be delighted to have you take part in this discussion. I take pleasure in introducing Mr. James Mills, Superintendent of the Arlington Heights Ranch, Riverside, one of our best known residents and a man you all ought to know.

THE VALUE OF COVER CROPS IN PRESERVING THE LIFE OF THE SOIL.

BY JAMES MILLS, OF RIVERSIDE.

I hope that you will give me a sympathetic hearing. I have a large subject. I do not feel capable of dealing with it in the manner in which it ought to be dealt with. It is a subject all of you ought to be studying. You could give days, weeks, months, years to it and not exhaust it. It is a subject which we must know more about if we are going to do our duty by ourselves, our fellows and posterity. It is a subject that will enable us, if we thoroughly understand it, to keep our soils in a real state of fertility, in first-class physical condition, in condition to do work for us more and more from year to year, and to be left in condition after we are done with it to do more work for those who succeed us than it did for us when we received it.

I am not very well to-night; yet I am not sick. If my voice gives out on me it is because I have got a cold. My subject is not a written one; I am going to speak, and whenever I feel that you are uneasy I can break it off short, and I will.

The Romans, two thousand years ago, used the cover crop to keep their soil fertile. They did not know just what effect it had on the soil, or, rather, they did not know just what brought that effect about which was apparent to them. They knew that after the growth of a cover crop, a crop of legumes, other crops succeeding them were better than where they were not used.

The Egyptians, for thousands of years, also have used these cover crops. The berseem has been used throughout centuries. No doubt Joseph, when he was premier of Egypt, saw the berseem used year after year and followed with the corn and the cotton and the sugar-cane; and those soils have been kept in very good physical condition, a splendid condition of fertility, by the use of these leguminous crops as well as by the overflow of the great Nile River.

The ordinary layman is not aware that the growth of our crops and the existence of agriculture and horticulture, and, therefore, the existence of life, animal life, on the planet, are dependent upon life in the soil, the existence there of micro-organisms, bacteria—bacteria which, in size, reach from 1-2,500 to 1-25,000 of an inch, and that from 30,000 to 1,500,000 of these are found in a gramme of agricultural soil—15.4 grains of soil. In places, in densely populated cities, where cleanliness is not observed, as in some of the Italian cities, we will find in the same extent, the same bit of soil, the gramme, from thirty millions to one billion of these micro-organisms.

Bacteria affect all conditions of life. They multiply enormously.

One of these little micro-organisms will multiply in one day to from fifteen million to sixteen million five hundred thousand; in two days to two hundred and eighty-one billion five hundred thousand; and in three days one of these little micro-organisms will multiply to forty-seven quadrillions. They can not multiply to that extent, it is true, because before they have multiplied so greatly they will begin to destroy themselves by the excreta which they throw off, thus poisoning the soil in which they live. I mention this, however, that you may realize and appreciate the tremendous forces with which we are dealing when we are dealing with these micro-organisms in the soil, the infinite power which is exerted on the soil and on the history, practically, of civilization by these tiny, infinitesimal micro-organisms with which we deal in the soil. They are, I might say, the life of the soil. Without them we can not grow crops. It is, therefore, well for us to remember that the first thing we must do with the soil is to make it a fit habitation for these micro-organisms which labor with us and for us for the upbuilding of agricultural and horticultural industries and, therefore, for the upbuilding of the civilizations which we are building and which have been builded before us.

We know that bacteria have to deal with the making of our butter. Bacteria make your milk sour. They give a better flavor to your butter; they give a better aroma to your butter. The Federal department to-day is actually growing bacteria stronger, more vigorous, more capable of doing the work that these little micro-organisms have to do in the soil and have to do in the arts and in the manufactures, and is distributing them to those who want them in their business for the inoculation of the soil and for the manufacture of butter. You know that all diseases—typhoid, tuberculosis, anthrax, lockjaw, and kindred ailments—are brought about by bacterial action. Bacteria are everywhere exerting an enormous influence upon the conditions that surround man. We sit down to our dinners and we eat the crude food that is presented to us; I mean crude in that we can not digest it; it can not enter into and become part of the blood and the fluids of the body until it has been softened, until it has been digested—that is, converted into forms of matter which will make blood and the fluids of the body, that it may be carried into the system to build the tissue and to sustain this organism with which man does his work. That is true also in the soil, that nothing can become valuable to plant life but through the activities of these micro-organisms. If it be true that no mineral fertilizer, inert in the soil or put in the soil itself, no phosphoric acid, no potash, nor anything you may use as a fertilizer, can possibly be of any benefit without the action of bacteria, then surely it devolves upon you as the part of wisdom to study these things, to study the conditions

of the soil that will best develop them and make them healthy organisms to grow crops for you, for without them you can not grow any crops.

The soil with which we have to deal, where does it come from? You go up into the mountains—possibly you have gone up into the Yosemite and traveled from the old Tioga road to Tuolumne Meadows; possibly you have climbed to the top of Lisle; possibly you have gone down the great cañon of the Tuolumne River to Hetch Hetchy Cañon, and everywhere you saw death. Everywhere you saw decomposition taking place. Everywhere you saw the tree that has grown for two hundred—for a thousand years—the great sequoias in those forests of the sequoia. You see some of the giants down and decomposition taking place, bacterial action taking place there to prepare them again for the growth of plants in the soil. Death! Decomposition! The tree, the vegetable matter and the animal matter that would there have life are decomposing. The detritus from the mountainside is being decomposed, disintegrating by weathering, disintegrating by cold, by water, by ice, and these together, the decaying vegetable matter and the animal matter, with the detritus, are carried in the floods of springtime from the mountains out into the valleys and there laid down. These mountains which we have traveled through were once upon a time a mile higher, piercing the clouds even a mile higher than now they do pierce those clouds, and they have been weathered off and carried down, and now in southern California and in central California and here in these beautiful, fertile valleys, we are growing our crops on the earth, on the rock that once was on top of the mountains, and in the valleys, and in the decayed vegetable matter that is incorporated in them.

Then, soil is but the detritus from the mountainside and vegetable matter and animal matter in process of decay, called humus—earth and humus. When we deal with this soil, cultivate and irrigate and grow our crops of corn and wheat, and oats and barley, and lemons and oranges, and all the deciduous crops, we are taking from the soil this humus, which is the life of the soil. The more we cultivate with our cultivators—here in California we do not allow the grass to grow in our orchards; we keep plowing them. Intense cultivation is our method, and the finer we cultivate it the quicker is torn out the life of the soil. Now, when the humus is exhausted from the soil we have again the very detritus that came from the mountainside. It is not soil; it is but detritus; it is but rock; it is but mineral matter; without the humus that gave it its life, which in its decomposition gave off organic acids and acted as a storehouse of oxygen, leaves you a sterile soil. Now, if that be the case, and it is the case, then the part of wisdom for us is to keep up the supply of humus in the soil because of the beneficial effect that it has on that soil; for without humus we have no soil, with-

out soil we have no crops, without crops we have no farmers, and without farmers we have nothing.

It was in 1891 that Winogradski and Warren simultaneously, the one in England and the other on the Continent, discovered this little micro-organism, discovered just what its mission was, discovered that the God of the Universe had placed in the soil a wonderful little creature whose mission it was to take back the nitrogen from the atmosphere and store it up in the soil that we might continue the processes forever and forever of the growing of crops and the feeding of animals, the one interdependent on the other. It was, I say, only in 1891 that they found this. Liebig and other great scientists wrote years ago that the time was near when the nitrate supplies of the earth would be exhausted; that because of the tremendous evils that follow our methods of cultivation the earth would be wasted, the nitrogen of the earth would be washed out and lost, and that all of the sources of nitrates in Chile and elsewhere would be exhausted and man would die because fertilizers could not be found anywhere to continue the growth of plants on which he lived; and it was when they found this little micro-organism that they appreciated the fact that Nature did not leave out a link in the cycle of life. I say the mission of these little bacteria is just this. Plant life decays, plant life is growing; animal life lives upon it, animal life dies, decomposition comes in. Bacteria, through their activity, decompose them. The nitrogen that is in the plant, the nitrogen that is in the animal, goes off again into the atmosphere; and right there comes in the bacteria, working in the leguminous plants and independent of them, also, and lays hold of the free nitrogen, carries it back into the soil, there again to begin the cycle that it went through for millions and millions of years—eons upon eons of time. God, in his great wisdom and power, has not left us helpless, then, but has provided us a means to get that which we need for the life of the soil.

This humus has a great mission to perform. It is physical life—it gives physical life to the soil. You and I can not do our work properly, can not do it well, can not do it happily, unless we are physically strong. No matter how powerful the intellect of man may be, if that powerful intellect is in a tiny, sickly body it is unable to do the great work which the Creator intended it should do; and therefore it becomes the duty of man everywhere to preserve this tabernacle of his soul that it may enable him to do the work given him by God, for himself and his fellows on the earth. It is true also of the soil; it must be kept physically well.

We, in this building and in our homes, need fresh air. We open the windows and the doors that the air may freely circulate and that we may have the oxygen to breathe into our lungs. It would be very bad for us if we closed down the windows and closed the doors and breathed

again and again the noxious gases that we gave off through the hours of the day from the lungs. Thus, we want the air to circulate. It is true also of the soil. The soil wants aëration, it wants to be kept open so that the air may circulate in it. The roots need to breathe, the plants need to breathe; the bacteria give them the oxygen to live upon. The soil needs ventilation—that the noxious gases, poisoning the roots and poisoning the soil if it has not opportunity to get away, must have that opportunity to escape. Ventilation! And, therefore, in the soil we must work to keep up that condition of aëration and ventilation. Humus, mixed with the earth in sufficient quantities, brings about that condition. It also enables the soil to contain more water. It gives it a greater absorptive power for water.

You know, as I know, that the growth of one ton of solid matter, be it whatever crop it may be, cereal or fruit, requires from three hundred to five hundred tons of water, which must be pumped up by the root system and root pressure and surface tension from the subsoils of the earth. Now, when we increase more and more the holding power of the soil for water we have done a mighty good thing for ourselves. Take, for instance, one hundred pounds of sand. It will absorb twenty-five pounds of water, and it will hold it for about four hours. Take one hundred pounds of humus soil and it will absorb one hundred and ninety-five pounds of water and hold it for weeks. Is it not, then, the part of wisdom that we so cultivate our soils, so work our soils, as to increase constantly from year to year the amount of humus, in order that we may get a better aëration and better ventilation and a greater holding power of water?

I want to tell you an incident that happened on a certain soil down south. There was a twenty-acre tract of orange grove that took an immense amount of water. There we allow one inch to five acres for the irrigation during the year. This twenty acres took ten times the water that was allotted to it, and could not have been held in cultivation if it belonged to an individual who had only the water that was belonging to that orchard—two inches of water, four to twenty, one to five. Samples of the soil were taken for eight feet down, every six inches of the way. They were taken to the laboratory and put under the microscope, and behold what was found! Piles of building stone! You see on the side of the road for the foundation of a new building piles of stone with jagged edges and spaces through which a cat may run. Just so was that soil, not to that extent, but under the microscope seeming like that. There was nothing but gravel. That was the trouble. The humus had been worked out and had not been replaced. Barnyard manure was put in the soil, covered under. Cover crops were sown, one a summer crop of cow peas, the other a crop of Canadian peas, and the next year this happened: They were ordered not to irrigate that soil.

There had been a splendid rain in the winter. The rain went down along the root system, percolated deeply into the soil and filled the subsoil. Every month after June there was dug a hole ten feet deep, twelve feet long, and eighteen inches wide, and into that the man went and examined the soil, finding considerable moisture in the subsoil, and, coming out, the hole was filled. You have got your root system; go after the water; it is there; the function of your roots is to get water—get it; and the water was held off until October, not an irrigation, constant cultivation, however, so that no loss of water would take place by evaporation, but that every drop of water would go through the hair roots and up into the trunk and through the tree to the leaf, there leaving the solutions of fertilizer to be manufactured into starches and sugar and then sent back to the tree to grow its fruit; and I have to say to you that not one single leaf wilted on that twenty acres that year, and only one irrigation during the summer time was given to that twenty acres for two years; and other pieces, like situated, like treated, were tested the same way. A scientific gentleman was told that, and he thought it impossible, but he took the trouble to go there and investigate the conditions down thirteen feet in the soil, testing it and taking it to the laboratory and estimating the quantity of water in that soil subject to the root system of the tree, and his decision was, yes, you can do it; yes, you can increase the absorptive and holding power of your soil by filling it with humus, so that in an occasion of distress you may be able to save your orchard without irrigation through a season.

The power of absorbing water is eight times greater in a humus soil than in a soil without humus. To get the best out of your soil you must have friability, tilth—I thought there was an Englishman here who might have heard that word and raised his eyes to find out what was the matter. We call it pulverization, we call it friability, fineness of soil. Take a cubic inch of soil. It presents but six sides to the hair roots of the plant. But divide it up into as fine particles as you can by proper cultivation and you will find that there are three million sides to the cubic inch which can be touched by the hair roots of the plant and the fertilizer taken from it that was in the soil moisture. Take a cubic foot of soil and, if I mistake not, I have seen somewhere that when it is divided into that fineness which you can get by proper manipulation of the soil it will present to the root system sixteen acres of surface. Think of it, that when you take that soil and divide it it will spread over sixteen acres! I don't think I am exaggerating. I tried to lay my hand on the authority this afternoon. There are some here who know and they can contradict me if it is not true.

Observe then. You go into a field. It has been plowed when it is a little wet; there are lumps the size of your hat, the size of marbles and on up to six inches or more in diameter. You know that you can not

get the fertilizer elements in that. There are vast quantities of fertilizer inert in the soil that must be gotten by the friability of the soil. There are forty thousand pounds and more of potash in the first six feet of California soils, and I have no doubt there are from six thousand to eight thousand pounds of phosphoric acid in an acre; that there are over one hundred and forty thousand pounds of lime; not so much humus, not so much hydrogen. But you have got to pulverize your soil into the very finest condition of pulverization if you expect to get out of it the result. You go on one man's soil and say, "How beautifully it pulverizes under the plow and the cultivator," and you go on another's soil and you see it in jagged lumps. You see in one field a large crop; in the other, a small crop. One man has great barns overflowing; the other has barns with the clapboards rattling in every breeze that blows from the four corners of heaven. You see his fences with moss on them because he has never been able to attend to them since the days of long ago. The one is the successful farmer, because he is getting out of the soil that which is in it for him; and the other is not getting it, because he has not properly worked the soil.

The temperature of the soil is affected by the humus, also. You take one soil and it is a dark color. The lady wears a light hat in the summer time that her head may not be too hot; she wears a white dress that she may not be too warm. In the winter time the man wears a black hat and a black suit because he is warmer. The heat of the sun is absorbed by the black. It is true of the soil. Heat is required in the soil. The humus will take action, the bacteria will be active with warmth in the soil. Everything becomes valuable through the action of bacteria, did I say? Bacteria will not be active under 47 degrees of temperature and they reach their greatest activity at about 97 degrees; therefore, we must see to it that we keep our soils warm. A dark soil is warm. Humus makes the soil dark. You may know, then, from the color of your soil whether you have a humus soil or a soil wanting in humus. A soil that is black will be several degrees warmer than one that is light.

Have you ever been in southern California or in northern California? Have you ever walked along the fence after a cold night when the frost kept you awake all night long for fear of the freezing of your fruit? Have you seen on one side of the fence, a week afterwards, conditions which warranted you in saying, "They have not been hurt; the leaves are in fine condition; the fruit is all right?" Across the road everything gives the appearance of frost. The one is frozen, the other is not. The one soil was degrees warmer than the other and the result was that it was warm enough to make the difference. That is true. You can keep your soil so warm that it will on some nights be the very thing that saves your crop. Your root system that may be near the

surface and the feeding roots, in the early spring when the tree is preparing for the greatest burden it has to bear in its life, the budding and the setting of the crop, depend upon the bacteria, and the bacteria can not be without warmth, and the warm soil will give more fertilizer to the tree, more crop to the tree, because it is warm, than the soil that was cold.

Again, lots of humus in your soil will keep your soil from washing. I forget the gentleman who read a paper a couple of days ago and who said the surface of his soil, because of great rains, was washed off and carried down. It is true. In some orchards you will see the soil all percolating down and running off into the roads and the gutters. In another tract you will find the very opposite. Why? There was no humus in one, there was lots in the other. The one was a humus soil, the other was not a humus soil. Now, these conditions are brought about by humus, this humus which is the life of the soil. By washing it out you get a sterile soil.

We heard here the other day from Mr. Crandall about the very best citizens that America has, the descendants of the men who years ago crossed the Allegheny Mountains to settle the lands that were west of them, and they moved from Ohio to Nebraska and Iowa, they have gone to Dakota and Minnesota, they have gone to Illinois; but to-day the soils that used to give them thirty and forty bushels of grain are giving them eight and ten; they are exhausted. And what are they doing? They are going up into the great northern country which Mr. Crandall has traveled over and which I walked over in 1881 for two thousand miles—a land richer by far than anything under the sun, richer than the black lands of Russia, land that will give them from forty to sixty bushels of grain to the acre. They exhausted the soils that they took years ago and they go off to take new soil. What was their duty to posterity? Their duty was to keep alive the soil, to keep fertile the soil, and by giving it humus that is what they would have done.

You know that we have about ninety millions of people in this country to-day; that we will have one hundred and twenty-five millions of people in thirteen years, according to a report of the Census Bureau; that we will have two hundred millions of people in 1950, and three hundred and twenty-five millions of people in 1990; and these three hundred and twenty-five millions of people must live off of the soil that to-day is keeping measurably prosperous ninety millions of people. We are not the owners of this soil; the Almighty did not give it to us as our own. We have the title deeds to-day, but to-morrow we are dead and gone from the land to which no one ever returneth, and it goes to another, and it is your duty and mine so to conduct ourselves in the management of these soils that we will leave them richer than we got them. Not that it will cost us money to do it. Be assured that the

men who are down at Berkeley, in Michigan and Dakota and Minnesota and Iowa and throughout all the states are endeavoring to teach us this principle of the handling of our soils, that if we keep them physically well by proper manipulation and put back the humus that we take out, we will get greater returns from year to year. For every dollar we expend in restoring the fertility of the soil we are repaid two.

Go down South to the slave states. When they had the slaves it was easier to go out and clear another hundred acres than it was to restore the fertility of the one hundred acres which the cotton and the tobacco and the corn had exhausted, and so they went on clearing acre after acre and leaving behind them drifting sand. They are re-establishing that to-day by growing cover crops of cow peas. They are doing the same in Illinois and all over the continent—re-establishing the conditions that were in the soil when they were laid down by Nature, by the growing of cover crops. Take a cover crop, then, and let us grow it. We will take a cover crop or barnyard manure to restore the humus. Go out and buy barnyard manure, buy what you can, but we find that we can not get enough of it to restore the soil. And if you could get it, we find that it costs from \$300 to \$700 for a ten-acre orchard to get barnyard manure to the extent of ten cubic feet to the tree. Now, if we all demanded that, and did not use the cover crop, we would not be able to pay for it, even if we could get it. But we find that by growing the Canadian, the Russian blue, the cow pea of the South, and all the other several varieties of cover crops, we not only get it at a nominal cost, but we restore the aëration and ventilation of the soil and give to the soil the organic acids that are necessary to make available the mineral fertilizers that are there for our use.

Take the cow pea or the red clover, they ramify the soil from every direction. I have followed a cow pea three feet into the soil. Why do you plow? That the air may get into the soil. Why do you plow in the orchard? That you may break the soil. Did you ever have a plow that went three feet into the soil? Did you ever have a plow that would lay up humus three feet deep, or with which, if sufficient air gets into it, will make humus? The cover crop will do it for you. The stubborn soil that is now trying your very soul because you have not sown the cover crop will be as friable as the onion bed which you used to weed on your knees on holidays and blame your mother because you could not be with the other boys playing baseball. Your cultivator will move through it easily; your horses will not sweat as much; they will grow fat on half the feed they would require when plowing and cultivating in a dead soil, that closes up as soon as you go over it; but with the humus brought about by the cover crop your soil will be so friable and so free and so light that your cultivator will move easily and you

will get a dust mulch to hold the water down that you can not get in a soil devoid of humus.

This humus, let me again say with all the force that I can, is the life of the soil, and without it all life is gone and you can not live with the soil that has lost its humus. Have you ever seen a man plowing a field when it is wet? He says, "I have got to do this, because to-morrow I have got another field to plow." What was he doing? Making adobe bricks! He could make them quicker than any Mexican that ever puddled them with his feet. He made his soil dead, and it will take him years to restore the evil that he did in that one hour. The humus, the bacteria, died in the hardened soil, because it could not get air, and the soil became dead; and if you could take a crusher or if you could take a miner's mill and pulverize all that soil, at a million dollars cost on a great big acreage, you might reach it in a little shorter time than otherwise you would, but it would take a long time to get it, nevertheless. Therefore, remember that you can not plow a soil when it is wet. Remember that you must use the humus. Remember that you can get that humus cheaply through the cover crop. It will cost you about \$35 to put a cover crop on ten acres. The root system ramifies the whole soil.

I will read you in a minute the two experiments which I made by analyzing these plants in the laboratory, to show you how much mineral fertilizer was got out of ten acres of soil and how much nitrogen. The cover crop is to get first the nitrogen. There are three million—am I right?—pounds of free nitrogen at your command from every acre of your orchard field. By the growth of the cover crop the little bacteria in the soil will go through the hair roots and you will soon see tubercles growing. The little bacteria are taking in the nitrogen and giving a portion of it to the plant in exchange for starch, and if you analyze that you will find an enormous amount of nitrogen has been gotten from the atmosphere for nothing.

What do you pay for nitrogen? \$60 for nitrate of soda, with only 16 to 18 per cent available in the ton. 320 pounds of available nitrate for \$60. But I can prove through the laboratory that I got over 2,000 pounds of nitrogen from the atmosphere for the \$35 that I expended and put into the cover crop. In growing a cover crop you are growing it to get the nitrogen, so that the mineral already in the soil may be available. Therefore, do not feed your soil with nitrates before the planting of the cover crop; do not feed nitrates; feed them phosphates, feed them potashes, and they will grow better and gather more nitrogen for your use.

There are 40,000 pounds of potash and 7,000 or 8,000 pounds of phosphoric acid and about two per cent of phosphorus available to the acre and about thirty-nine per cent of the phosphoric acid. Yet, nevertheless,

you have no right to exhaust that store. It is to do for all time, and more of that inert material will become available by your using somewhat of the commercial fertilizer that will cost you from \$20 to \$35 per ton. You will get more nitrogen. Your crop, because of the prodigality of your soil, will be better, your bank account will be greater, your wife's smiles will be brighter, your children will be clothed better, the conditions surrounding your home will be immensely improved, you can send your children to the best schools in the land and give them the opportunities that others get, if you will rightly operate the soil that you have got in your power to operate. Yes, I say that you can become rich on ten acres of soil in California. I say you can? I have seen it done. I have seen a man in fifteen years become worth \$75,000 with a start of just \$400 after the payment for his land, planting his orchard, growing it, buying others with the profit and being worth to-day \$75,000 and off his orchard getting \$15,000 net income this year. But he was an ideal farmer. He did everything that the soil required, and he became rich.

Let me just now, in closing, tell you about these analyses. I had eight varieties of cover crops a couple of years ago, to endeavor to find out which was the better. I found that I got from one of these varieties 68,350 pounds of green material to the acre for the vines and 12,705 pounds for the root system; and from another, 68,000 for the vine and about the same for the root, and all running the same, from about 60,000 to 68,000 and 70,000 pounds. Now, out of some of these varieties I got 101 pounds of available phosphoric acid to the acre—measurably available, more fully available than in its inert state in the mineral matter of the soil; and of potash, 317 pounds, which after the decaying of the cover crop when it was plowed under, would become more readily available than before; and of nitrogen, 276 pounds. And so with another: phosphoric acid, 91 pounds; potash, 241 pounds; nitrogen, 284 pounds. Of the *Vicia sativa*, 131 pounds of phosphoric acid; 364 pounds of potash, and 244 pounds of nitrogen to the acre. That is, 1,300 pounds of phosphoric acid for ten acres, which are our units, as it were, and 3,640 pounds of potash, and 2,440 pounds of nitrogen. Now, these are demonstrations of our own. Our chemist may not have been perfect, but I have compared them with works of Snyder and King and Hilgard and others, and I don't think we are very far off—in fact, I know we are not very far off, if at all.

Now, let us look at that. I said that we got the amounts that I have stated. Compare them for a moment. You buy, say, ten pounds of complete fertilizer for every tree in your orchard. There are a hundred trees to the acre, a thousand trees to the ten acres. Ten pounds to the tree would be five tons of commercial fertilizer. Five tons would be \$40 a ton. That fertilizer would contain 4 per cent of

available nitrogen, 8 per cent of phosphoric acid, and 1.22 per cent of potash. If you want any more potash in a complete fertilizer you will have to pay larger sums. If you want 5 per cent they will put it in for you and you will pay for it at the rate of at least six or seven cents a pound, the actual potash. Four per cent of nitrogen is 80 pounds to the acre, 80 pounds to the ton; 400 pounds of nitrogen to ten acres, five tons, as compared to over 2,400 pounds from the cover crop. Of the phosphoric acid, 8 per cent is 160 pounds to the ton, or 800 pounds to the five tons. I think I said that from one variety of cover crop we had 3,600 pounds of phosphoric acid to ten acres, as against 800 pounds from a commercial fertilizer—four and one-half times as much—not all available, but available enough. You do not need to use as much phosphoric acid; you must use some. You can easily get it by analyzing your crop; you can easily get it by going to the authorities and asking them how much comes from a crop of rye or potatoes or corn or cotton, and you ought to put back a little more for waste, but it won't be much, and you get these through the cover crop, to a great extent; but the nitrogen is what you are after. It has been said, and said truly, and I think the professors here will corroborate me when I say that the scientists will say to you that for the growth of crops you can get enough nitrogen from the growing of cover crops, the bacteria taking it from the air and laying it up in the crop that you grow, and that you will not need to buy after your soil fertility has been restored, if you have exhausted it, in commercial fertilizer. In fact, it is true that if they had not found how to manufacture it from the atmosphere, you would have to get along without it, because the available sources in Chile and elsewhere would be used up at our present rate of use of it.

Now, I think I should close. There is a summary here that I will have printed in the bulletin, if it is thought wise to print what I have said, summing up just what I have said, and I will close. I have talked an hour; I wish I might have a couple; but I wish that you would think of this, that you would go to the authorities—get Hilgard, get King, get Bailey, get Snyder, get Voorhees—study them. The lawyer, when he is asked to give an opinion, goes to his library and he will tell you what your legal rights are. But the farmer, when he is up against a problem, stumbles along like his forefathers and wonders what is the matter. The matter is he is not “up to snuff”; he is not up to his business; he has not read. Don't you know, ladies, don't you know, gentlemen, that you need more brain power to farm right than any physician or minister or lawyer needs to be a good physician, or good minister, or good lawyer? (Applause.) Wake up! Get your library. What are these men writing for us for? What are we paying them for? What are Stuben-

rauch and Waite and others experimenting for, but for you and for me? For \$25 we can get the result of labors that have extended over a hundred years and we can put it on our shelves and with a little work, like Elijah did a while ago, we can eat it and get it inside of us, and you will be better farmers a hundredfold, because you have got the result of labors of wise men for many years preceding you. But you go along year after year, just like the Egyptian farmer, with his old plow that he used in Joseph's time. I mean this theoretically—you don't study. Go and get your library, and when this matter confronts you take down your books and delve and dig, and there is not a problem that confronts you that you will not solve without writing to the university. You have no right to write to them, because they have put all in print, and you can get it in thousands of bulletins and you can get it in the splendid scientific works that have been given us in the last century.

Solomon said, "In all your getting, get wisdom." I say to you farmers, "In all your getting, get humus in your soil." (Great applause.)

THE CHAIRMAN. This matter which has been so splendidly presented by Mr. Mills is now open to discussion.

MR. JUDD. I would like to ask Mr. Mills one question. Does preserving the leaves—say, for instance, that you have low heads, that you prune your orchard low, so that the leaves do not blow away from under the trees and they lie there and decompose and make a mulch, wouldn't that furnish humus enough ordinarily on good soil without the extra cultivation?

MR. MILLS. No. It will furnish it in the mountains, where the dense foliage covers all the hillside and all the valley, and where the plant life grows in the rainy season. There you find humus in great quantities that is swept down to the valleys for use. But the leaves of trees in our orchards, no. You would hardly know that they had been there.

MR. BRINK. I would like to ask Mr. Mills if alfalfa and burr clover are good.

MR. MILLS. Yes; burr clover is one of the very best. I had twenty-one tons of seed to use this year. It is one of the richest, and it is the natural cover crop, and those of you who have deciduous crops perhaps can let it go to seed, and then it will reseed itself.

MR. BERWICK. Mr. Mills, I wish to ask you if that thirty-five tons per acre, I think you mentioned, more or less, of vicias, was it—does that include the root system?

MR. MILLS. The top. I think I said there were twelve thousand pounds in the root system, and I got that by taking ten feet square and digging a trench around it and taking a power sprayer and spray-

ing every bit of the root system and weighing that green, then weighing it dry.

MR. BERWICK. Of course, you know the vicias are used very largely as actual feed in England. Would it be better to cut those vicias and feed them to cattle?

MR. MILLS. If your conditions are such, the cutting and harvesting of them and feeding cattle is the more preferable way, because you can feed and fatten cattle and not lose over 10 or 15 per cent of the value of the vines, and you can get the humus deeper down than you can by applying it in the shape of barnyard manure.

MR. BERWICK. I understand there were thirty-five tons of green feed per acre at one cutting.

MR. MILLS. Yes. That crop grew ten and a half feet long in the vine.

DR. SHERMAN. Can you grow the burr clover without irrigating?

MR. MILLS. Not with us. I should think that here the burr clover would grow splendidly, and yet last year it did do splendidly for us without irrigation, because we had continued rains. This year we had October rains and none since.

DR. SHERMAN. It is still alive, but not growing?

MR. MILLS. Yes; and we can not afford to let it go beyond at least February now, because last year the moth came and laid its eggs and the cut-worm came and they got our oranges.

DR. SHERMAN. If they had let it go to seed and the ground got so hard they could not plow it.

MR. MILLS. That is true. My irrigation cost me a very great deal this spring. The cultivation and irrigation of the lands went from \$2.49 to \$3.70 over my estimates, because I had to use ten men where otherwise I would have used two for irrigation. I had to flood the ground. But I never had my soil in better physical condition, better fineness, and I never had such a big crop of lemons. We have fifty carloads more lemons on our trees this year than we had last year.

MR. CRANDALL. I would like to ask Mr. Mills if much of the humus and these necessary elements in the soil are not lost to our orchardists each year by too early turning under of the cover crops that naturally grow on the soil? It has been my observation in the Santa Clara Valley that that is the case.

MR. MILLS. When do they turn them under?

MR. CRANDALL. Just as soon as the rains come so that the ground is softened sufficiently, whether it is in January, or February, or March.

MR. MILLS. Now, it is hard for me to answer that, because I don't know just the conditions. I will answer it from our own standpoint. This year we put in our cover crops beginning on the 15th of September.

We will commence plowing about the middle of January and finish before the first of March. The cover crop ought to be turned under before it goes to seed. You ought to have your cover crops in, your soil well disintegrated and in a perfect condition of tilth, warm, so that it will absorb the winter sun, so that the bacteria will be active, so that in the blossom time your trees will get all of the food that it is possible for them to get and all of the moisture; whereas, if you leave the cover crop there to absorb the moisture your tree will not get that which it needs in that particular period of its existence, the most important period of its existence, the setting of the crop and holding of the same.

MR. CRANDALL. How can that be overcome, when you have no means of irrigation excepting by periodical storms and the rains do not come early enough in the fall to start this vegetable growth—until, perhaps, after the first of the year?

MR. MILLS. Then, truly, you have a condition which we have not got. If you can not start your cover crops until the first of January, if your conditions are not like ours, then I would wait until the summer time and I would put in, if I could get irrigation water, the cow pea and grow them, as I have repeatedly, in the orchards.

MR. CRANDALL. I believe you will find that in the greater portion of the State the water is periodical, and we can only get it when it comes and it doesn't come just when we want it.

MR. MILLS. That is, you irrigate in heads?

MR. CRANDALL. Shut off in September and do not get it until February.

MR. MILLS. We shut it off in September, but if we need it in October we turn it on.

MR. CRANDALL. But the rains do not come early. It is only the later rains that we get in the greater portion of California that I have visited, except in some of the more favorable valleys.

MR. MILLS. Then I could not possibly tell you what I would do under those conditions. It is for you to solve that question. This is true, that here in the north—I see in the papers that the very condition of which I have been speaking has already come. A man from Sonoma, writing to the *Rural Press*, stated that his crops were decreasing, that his soil was becoming worked out, and that he believed he was losing his humus, and asked for some information about the growth of cover crops. If you have not got sufficient rains to grow them, I don't know what I would do. I believe if you would use the burr clover before your water is turned off, completely saturate your soil and thoroughly cultivate it in order to hold an immense amount of water in the soil, plant upon that immediately your cover crop, so it will make a growth of six or eight or ten inches before the soil becomes dry—that is the way

we do it. We saturate our soil, then we cultivate it thoroughly and put in our crop.

MR. PEASE. I would like to ask one question that applies in the south. What, in your opinion, is the effect on the coming crop of very late plowing-in of the cover crop, say plowing-in as late as April?

MR. MILLS. I will say no effect. Now, I will explain myself. Last year it was a mighty big effect. It cost us tens of thousands of dollars, for the reason that the cutworm moth laid eggs on the cover crop. They hatched, and we got myriads of the cutworms, and they devoured our ripe crop in large quantities and devoured our young fruit. Plowing under in April I have found to do no injury, if I could keep my soil moist enough and warm enough. I do not plow my cover crops; I turn them under. A cover crop does the work of plowing. It goes deep down and plows your soil deeper than any plow made. I do not cut my soil more than five or six inches, and then I use my discs and disintegrate the soil and make a mulch of it, and it is a mulch that gives me power to hold water, and my root system in its digging down, eighteen inches, or two feet, or three feet, allows the water to percolate deep into the soil, and as the water spreads through the spaces between the grains of the soil, the air follows deeper down and I get a finer aëration. I need the air, I need the oxygen to set it afire, as it were, to start fermentation and to give me that which I need in the organic acids of the soil. I do not think I have suffered any loss, yet I say that this year our cover crops will be turned under by the first of March, because we will avoid any loss from the cutworm, and if there is any difference it will not be a detriment, because my soil will be warmer, my cultivator will make more fertilizer available. This is true, that a cultivation of a budded crop is as good as a fair application of nitrate of soda. It pays to cultivate and cultivate and cultivate. The finer you cultivate up and down through your orchards, the better your conditions, the better your crop.

MR. PEASE. The reason I asked that question is because we have parties down there who have said that owing to the fact that they plowed their orchard late in April they had come to the conclusion that the trees would inevitably drop their fruit. What was the trouble with them, was it because the ground was allowed to get too dry?

MR. MILLS. If any man will plow an orange orchard or any other orchard in the month of April, eight inches deep, he will certainly greatly injure it. He has cut off the feeding roots that are near the surface. It is warm there and naturally all the feeders come up into the warmer soil and get most of their food there, and if he goes in and wickedly cuts eight inches of soil at that period he will lose, and he ought to lose.

MRS. RANSOM. I would like to ask Mr. Mills if this burr clover that comes up without being sowed is the one?

MR. MILLS. Yes.

MRS. RANSOM. That comes up without our planting it. We use it for grazing purposes. The cattle do not eat it in its green state, because it is sour. Didn't you state that the burr clover grew some feet high?

MR. MILLS. No; that is the Canadian pea. Burr clover hugs the ground.

MR. BERWICK. Mr. Chairman, I feel rather at sea. I think we have been taught in previous years, by those who were supposed to know, that we should not encourage roots within eight inches of the surface, at least we should have the roots go to a lower level than that; that we should, as far as possible, cultivate a full depth of eight inches and have that soil loose and fairly free from roots. Mr. Mills now suggests the contrary practice. In my practice I have plowed as late as April and had excellent results, plowing-under burr clover that was very hard to tackle, and had no bad results from plowing eight inches deep. My practice was in Carmel Valley.

MR. MILLS. I don't want it to be understood that I do not cultivate deep. If you will show me a dozen farmers in California who cultivate soil eight inches deep I will give you a new hat. I do cultivate deeper than any man in California, I think, and I try to get down eight inches during the hot summer months. I put four large mules, running from 1,400 to 1,500 pounds, on to an eight-foot cultivator, and I put it in the ground to the beam. The tooth is kept always new and the point is nine inches below the bottom of the beam of the cultivator. Of course, in its progress through the orchard it piles up the mulch in front of it and it does not get nine inches in the ground; it gets as near eight inches as possible; but I never think of plowing eight inches deep in the cold months of the year. Think of it, January, February, December! You have got your overcoat on. Sometimes you have got an overcoat on your tree. Sometimes you have got a fire in your orchard. Your soil is cold and the feeding roots are coming to the surface to get what they can of the available fertilizer made available by activities near the surface. The sun's rays are absorbed during the day, given off at night. There the warmth is, there the fertilizer is available, and we have found it injurious to plow our orchard deep at that time. But when May, June, July, and August come, then with all the power of our might we cultivate, and if a four-horse team can't do it two days hand-running they are put by to rest and another is put on. It must be cultivated, because we have got to keep the water in the soil to make available the fertilizer that is in the soil, that the root system may get the moisture and the fertilizer in solution up to the leaf, and the solution

manufactured into starches and sugars and carried back to feed the tree. And I say again, Mr. Berwick, that you are wise in part of the year cultivating as deep as horse flesh can cultivate, at least eight inches, not deeper, and I find this, that it is mighty hard for me to reach even eight inches. If you went into my orchards where I said I put it in eight inches and took out your rule and put it down you would very likely say, "How is it, Mr. Mills?" It is pretty hard to get men to sweat their horses. You have got to be there all the time. Therefore, don't misunderstand me. I cultivate deep at the proper season; I do not at the improper season, as I understand it.

MR. BERWICK. Then you encourage a temporary root system to supply a temporary need, and destroy that system later on?

MR. MILLS. If a man faints with heart trouble you will apply quickly the strongest possible stimulants to revive the action of the heart, and after it is revived you will apply that thing which will give him constant returning strength. I say again, that when the atmosphere is cold and the soil is warm only on the surface, warm enough to encourage activities, fertilizer becoming available, then I do not try to destroy the activities that are there working for my benefit through the tree. Now, I may be wrong. Am I wrong?

PROFESSOR WICKSON. I think you are right for an evergreen tree.

MR. ROEDING. I would like to know from Mr. Mills what cover crop he used prior to using the clover?

MR. MILLS. In our locality I find that the vicia has given me the best result. I find that the *Vicia sativa* has given me the best results of any of the vicias, and I would encourage in every possible way the growth of the seed up here in the north, so that we may get it at a reasonable price.

MR. ROEDING. Your soil is of a heavy nature.

MR. MILLS. The great majority of our soil is rather light. It grows magnificently.

MR. ROEDING. How many pounds do you seed to the acre?

MR. MILLS. Fifty pounds this year.

MR. ROEDING. What is the method of seeding?

MR. MILLS. The regular seed drill.

MR. ROEDING. In seeding with the drill do you arrange the seed in such a way that you can get furrows through the rows so you can irrigate?

MR. MILLS. I hang my furrowers to the axle of my drill. The drill works through the orchard, drops the seed in the soil five inches deep, then the furrowers come right along and make the furrow.

MR. ROEDING. The plow is attached to the drill?

MR. MILLS. Attached to the drill so that I do not need to do again at great expense when I might do it all in one turn.

MR. ROEDING. Then, if the ground should become dry after you have planted the seed, you irrigate?

MR. MILLS. We irrigate through those furrows. We irrigate the soil first, cultivate it as moist as we can, drill in our seed, at the same time furrowing it out; the seed then germinates and grows six, eight, ten inches at times before we have to irrigate. Last year we did not have to irrigate. The rains came in beautiful showers and the cover crops matured for us without irrigation. This year we had to turn on the water just ten days ago.

MR. ROEDING. Have you ever been troubled with gum diseases from the fact that the ground was closely covered with the cover crops?

MR. MILLS. No; we can not get the cover crops anywhere near the trunks of the trees. The trees are ten and twelve years old, and the cover crop is put in, of course, on the outside of the branches of the trees both ways, so that we will cover every foot of the orchard that is available for the cover crop. We have, however, some gum disease—I am happy to say very little; I am happy to say that we are able to control it; that on thousands of acres it would be hard to find fifty trees. However, you will find it, Mr. Roeding, down south in tremendous quantities. I know orchards in which there is not a tree that is free from the gum disease, because the orchards really need drainage. If they were mine I would put drains in, tiles, and draw off the water.

MR. ROEDING. It is a fact that a light soil will not be as much liable to gum disease as a heavy soil?

MR. MILLS. I am quite sure you are right.

DR. SHERMAN. Did you ever inoculate the vicia as you do the cow pea?

MR. MILLS. No. The species of bacteria in our soils that are natural and that inoculate the burr clover are the same that work on the vicias—all varieties of vicias. The species that work on the cow pea are not in our soils, and we have had to inoculate for them.

DR. SHERMAN. I had it in two places last year and did well in one and not in the other.

MR. MILLS. The cow pea?

DR. SHERMAN. No, the vicia.

MR. MILLS. If your soil is devoid of humus you will have very few bacteria in it. Go to another orchard where you grew successfully a crop and take a few sacks of soil and spread it over your orchard. Throw it over another soil before putting in your cover crop and you are inoculated. The first year I inoculated the soil and I inoculated the seed with bacterial matter that I got from the Department of Agriculture at Washington, and I got good results from it.

MR. BERWICK. I want to ask you if you don't think a well-drained soil is a warmer soil than one not so well drained, and whether the plowing would not have the effect of draining the top soil?

MR. MILLS. A soil that has too much water in it is in a very bad condition for fertility, for the air can not go where water is. If your soil is in that condition and there is no drainage from below, then a plowing of that soil will be very beneficial, because the sun will drain your soil, the winds of heaven will whistle through it and take out the moisture; yet, if it takes the moisture from your surface soil it will take out that which gives you the best conditions in the soil. Still, if you can not get the best drainage because you have conditions of hardpan, and you can not get rid of your moisture, then plowing will do good; but I never had any soil that didn't give me sub-drainage. My great trouble is to get water enough in the soil.

MR. BERWICK. But we loosen our soils in California to retain moisture, and in loosening our soils in the spring I maintain we retain the moisture rather than lose it.

MR. MILLS. If you will plow your soil, disc it well, follow it up with the cultivator and the harrow and keep it well pulverized and get a dust mulch, and every time the rain comes again cultivate and harrow, you will hold a large percentage of the moisture; it doesn't get away. But I don't plow, for the reason that my cover crop does my plowing, as I see it. I plow for aëration. My cover crop aërates the soil. As it decays the channels open up and the water goes down deep and the water fills the soil. Therefore, I get more moisture, because I have a better percolation of the soil. I hold it, because I have more humus. I hold it and have better conditions with the air following the moisture after it has equalized itself in the soil. If, however, there is more water than there should be in the soil, it is up to you or any other intelligent farmer to treat his soil in that way which will bring about the best results with that particular soil.

MR. O'BRIEN. If I want to sow cow peas next year, how shall I determine whether my soil contains the bacteria?

MR. MILLS. If you have not grown cow peas before, you may know that you have not the bacteria.

MR. O'BRIEN. How shall I put that in the soil?

MR. MILLS. You will send to Washington and ask them for that special bacteria. They will send them to you with minute instructions how to inoculate your seed and your soil. Follow those instructions carefully, and you will take your seed in due time and drill it in the soil and you will find that they have increased in the soil and that the bacteria begin to work on the nodules on the root, and next year you will have better and better conditions. That is, however, a summer

crop, not a winter crop, easily frozen. It must be planted early in the summer, say April or May, and then plowed down in the fall.

(At this time, on motion of Mr. King, duly seconded and carried, the Convention adjourned until to-morrow morning at 9:30 o'clock, but the members to immediately come together again in special session.)

IN SPECIAL SESSION.

THURSDAY EVENING, December 5, 1907.

MR. GERALDSON. I thank you for the courtesy you have accorded me and hope you won't be disappointed. I feel that, coming after the scholarly effort of Mr. Mills, my paper will appear crude, but you can class it as the effort of the man with the hoe as against the scientist and the student. I know I am going to shock you to some extent.

OVERWORKING THE SOIL.

BY GERALD GERALDSON, OF NEWCASTLE.

I can now just imagine how the good professors, and the sturdy, conventional old wheel-horses of good husbandry will "swat" me when they get a chance. But the truth must be told, and apparently I am elected by fate to tell it and to take the consequences—first lots of "*swats*," but finally vindication, full and glorious, "for truth crushed to earth will rise again"—and time will certainly demonstrate that my views are sound and that it has been my good fortune to stumble onto the true solution of our troubles in the way of soil destruction, and which the accepted authorities have missed altogether.

It is the mechanic who actually builds and operates the engine who improves it. It is the man who actually follows the plow and who comes in actual contact with mother earth who most accurately sees and feels her needs. The same intimacy that you can develop with your trees and flowers, you can also develop with mother earth herself.

To say that soil becomes exhausted after thirty or forty years of cultivation must be a mistake. If it were true, the race would speedily starve. Nature must have a way of finally overcoming the damage which man, in his misguided enthusiasm, does during his stay upon a given piece of land.

If we climb up Time's ladder a little way, so that we can look out over a period of say one hundred years, we will see that she finally

forces him to *quit cultivating*, and to give the soil a rest, as has occurred in many places in the East and is even now occurring to some extent in California.

If a man works constantly night and day, within five or six days at the outside he will be compelled to rest. If, as often occurs in the mines, a man works seven days in the week, month after month, he, too, will finally be compelled to stop and rest. But if a man works six days in a week, sleeps six nights, and recreates on the seventh by whatever means best suits his wish, he will ordinarily live to a good old age in health and vigor, and will accomplish vastly more work in the long run than either of the other fellows, other things being equal.

Now, when I take a piece of land and cultivate it every year, I am making it work night and day, and the result will be just the same as in the case of the man; namely, utter prostration when the limit has been reached.

But you ask, How can you handle an orchard or a vineyard in any other way? This brings us to the kernel of the matter.

The most superficial study will show you that soil anywhere simply consists of little particles of rock mixed with decomposed vegetable matter, or *humus*. Now, in the beginning there was nothing but rock, so how did the humus get there? If you will watch closely you will see that nature put it there, through centuries, by adding *dry matured* wood, leaves, twigs, and grass to the little particles of rock.

When the good husbandman plows-under green grass, he is only giving the man working night and day a drink, because green grass is nearly all water. When he hauls a load of stable manure, he is only giving him something to eat, and mighty little at that. And when he puts on chemical fertilizers, he, in my opinion, is only giving the man a drink of whisky, because he is getting sleepy—the results are only temporary. The last condition of that soil is worse than the first.

It has never occurred to him that the poor fellow might need a rest and that it might be highly economical and advantageous in every way to give it to him—and to give it to him regularly.

But you ask, How can you give an orchard or vineyard a rest without ruining it? Simply this way: We will call the space between two rows of trees or vines a "middle." Just *plow alternate middles on alternate years*. That is the whole thing in a nut shell. In other words, *plow half of your land each year*, not all of it, and do it this way, *alternate middles on alternate years*. Keep it up for four years and watch the results.

The first and second years you will call yourself a fool and a lunatic and numerous other things, and your neighbors will quite agree with you. The longer you have been following in the good old way the more nearly your soil will resemble Portland cement, on account of lack of

humus, and the harder will be the strain on your trees and your nerves. The strain you can overcome very largely.

The third year, however, you will begin to see results, and the fourth year, unless your soil is very badly off, the battle will be won, when you will begin to get an ever-increasing crop of natural grass—or artificial, if you wish—which you will plow-under next spring in a dry, matured condition, in which it will be worth about ten times as much as it would have been were it plowed under green, and you will find yourself on a self-sustaining basis, when you can get crops of fruit indefinitely, and where your soil will get better and better instead of worse and worse, provided, of course, that you continue to cultivate in exactly this way.

I lay stress on this way because it always provides loose, cultivated ground on one side of your tree and also provides frequent firebreaks, which will be very necessary when the grass gets well started, as it will about the third year.

The mere fact of the soil being unplowed for a year is a benefit to it, as it turns over next year with a mellow, granular appearance, more and more resembling its virgin state as our system continues; but this is a mere detail.

We are now told that plants, in growing, secrete in the soil substances which in time prevent their further growth and development. In forests we find many species, large and small, growing indefinitely in health and vigor without any sign of starvation or soil exhaustion. The secret of this, I believe, is that one species feeds on the excretions of the other; and I believe that grass and weeds growing in an orchard or vineyard feed on the excretions from the trees and vines, just as surely as they in their turn provide the only adequate supply of that absolutely indispensable *humus* on which the trees and vines must live, if they live at all.

At all events, we have reached in our experiments a result which points very strongly in this direction.

Six years ago our sole aim and object in life was to destroy every "weed," so called, and every evidence of a weed, in our orchard. We plowed, and then plowed again, and then cultivated about four or five times, until the surface of the ground was almost as fine as Portland cement—and baked about as hard, when it got a little water on it. The first time we irrigated the water would soak out about two feet from the ditch. The second time, about eight inches; and the third time, it would be running out of the end of a row thirty trees long in about thirty minutes, and would not soak six inches away from the ditch in twenty-four hours. By next spring, when we plowed, we would have about two inches of *green* grass to plow under. At that time we were compelled to irrigate trees on "old" land every seven or

eight days, and even then we could not keep them from showing need of more water. We found it almost impossible to get the fruit on trees on such ground up to size, and trees with any considerable crop of fruit made almost no growth.

Now, after five years of the system of plowing alternate middles on alternate years, what is the condition of affairs? The physical condition of the soil is altogether changed. It is as "mellow" as any ordinary piece of new land. We irrigate about once every month. The quality of our fruit on "old" land, thus handled, is as good as any we ever produced on new land, and even with heavy crops our trees make a vigorous growth and give every evidence of health and vigor.

In laying off the land for plowing, we so arrange, as far as possible, that these unplowed middles will lie crosswise to the flow of the water caused by the winter rains, because, while the second object of this system is to put more humus in the soil, the first object is to prevent the washing away of that which we already have.

Now, when we plowed last spring I feel confident that we plowed under an amount of natural grasses, including burr clover, easily equal to fifty two-horse loads of stable manure to the acre.

Our experience has proved beyond question that the covering of dry grass which we have on the unplowed middles through the summer, and the good physical condition of the soil amply offset the supposed increase of evaporation due to its unplowed condition. This must be so on account of the less irrigation required to get better results than ever. As we get uniformly good results with all kinds of fruit we grow, I feel confident that a careful, scientific study of the matter will show that this system will enable nature to replace not only the nitrogen required, but all other chemicals necessary.

(The special session was thereupon duly adjourned.)

PROCEEDINGS OF THE FOURTH DAY.

FRIDAY, December 6, 1907.

The Convention was called to order by Chairman Jeffrey at 9:30 o'clock A. M.

THE CHAIRMAN. Is there any business you wish to dispose of before taking up the program?

MR JUDD. Mr. Chairman, with your permission, I would like to present a couple of resolutions so they can be acted upon at the same time.

Reads resolutions, as follows:

Resolutions Favoring Forest Reserves.

WHEREAS, The agricultural and horticultural interests of this nation are the foundation of its national life and prosperity; and

WHEREAS, The prosperity of vast areas of our agricultural and horticultural lands are dependent wholly upon the waters that have their rise in the mountains; and

WHEREAS, The denuding of the mountains in this and other states threatens the turning of vast areas into desert that are now rich and productive; therefore, be it

Resolved, That we, the fruit-growers of California, in convention assembled, do most heartily indorse the enlightened and far-seeing policy of President Roosevelt and U. S. Forester Pinchot in their efforts to conserve the forest reserves which conserve the water which conserve the agricultural areas; and be it further

Resolved, That copies of these resolutions be forwarded by the Secretary of this Convention to President Theodore Roosevelt and U. S. Forester Pinchot.

Resolutions of Thanks.

WHEREAS, The Thirty-third Fruit-Growers' Convention is now nearing its limit, and it has been one of the most enjoyable and successful meetings in the history of our association; and

WHEREAS, We owe much of its success and enjoyment to the good efforts of the people of Marysville and Yuba City; therefore, be it

Resolved, That we tender a vote of thanks to the Committee of Arrangements who have taken charge of the details of the work connected therewith, for the able manner in which that work has been done, for the excursion provided for us over the electric roads, and for the care they have displayed in looking after every detail for our comfort while among them.

Resolved, That a vote of thanks be tendered to the Women's Civic Improvement Club of Marysville and Women's Improvement Club of Yuba City, and their associates, for the very brilliant and enjoyable entertainment provided for us on Tuesday evening, and that this also include all who took part on that occasion.

Resolved, That we tender a vote of thanks to Rev. W. S. Wilson and the Trustees of the Presbyterian Church for the use of that edifice in which to hold our meetings, and also for the care taken by them for our comfort during the time of our sessions.

Resolved, That a vote of thanks be tendered the local press for the work done

by it in promoting our Convention by many notices for several months past, and for the able and accurate reports made during the holding of our sessions.

Resolved, That we express our appreciation of the courtesy extended by Mr. Eben Boalt of Palermo in presenting each delegate with samples of fine Navel oranges from his grove.

THE CHAIRMAN. There is another resolution to be referred to the Committee on Resolutions.

The Secretary then read the following resolution:

Resolution Favoring the Alaska-Yukon Pacific Exposition.

Resolved, That it is the sense of this Convention that the fruit-growers of the State, representing one of California's leading and significant industries, should cooperate generously with the Governor and his representatives in the effort to make a strong and effective showing of their interests at the forthcoming Alaska-Yukon Pacific Exposition, to be held at Seattle, Washington, in 1909.

THE CHAIRMAN. If there is no objection, that will be referred along with the others.

In the absence of Mr. Messenger, Secretary Isaac read the following paper on the "Commercial Value of Ornamental Trees":

COMMERCIAL VALUE OF ORNAMENTAL TREES.

BY C. B. MESSENGER, OF LOS ANGELES.

Some time since, when one of the largest tourist hotels near Los Angeles was being constructed, it became desirable to make certain changes in the plans. After the architect's changes had been accepted and the contract let, it was found, on making measurements, that one of the many fine, large live oaks must be sacrificed. This was contrary to the wish of the owner, and he demanded that still other changes in plans be made so as to save the old oak. This the contractor refused to do, as it would cost a large sum. Instructions were finally given, however, that the changes should be made so as to save the tree, providing the additional cost to the owner should not exceed \$5,000. Five thousand dollars may then be taken as that one man's estimate of the value of that oak tree in that particular location.

Again, upon the occasion of widening a street in Los Angeles, it became necessary to destroy a beautiful "pokeweed"—*Phytolacca*. The owner refused to have it destroyed unless he be compensated for the loss of the tree, which to him was of great value. The matter was referred to arbitrators, and after consideration of the facts he was allowed the sum of \$500 for his tree.

Other instances might be given where a price has been placed upon a tree or a number of them, or where large sums have been spent in securing and moving to a certain location trees which appealed to the fancy of the owner. But the above two instances may be sufficient to cause us to ask, Can any such value be placed upon trees?

Let us grant that the first instance of the \$5,000 valuation is extreme, and while it may obtain again, it is highly improbable. But the second instance surely is not, for after careful consideration fair men made such award as compensation for its destruction.

But aside from the financial value—the calculated, hard and fast value of so many pounds and ounces for so many dollars and cents—let us look at another value, still greater. Let us go back to the old days when the “wood lot” was common, when a whole community gathered on the bank of the river under the great sycamores, walnuts, maples, and beeches and enjoyed a day of unadulterated happiness. Such a grove brought many a stray dollar to a community.

It is not possible to compute the amount of gold poured into Switzerland's lap because of her wonderful mountains. Neither is it possible to compute the gold poured into California because of the fame of her giant sequoias. The lumber man looks with measuring stick in hand, and begrudges the waste of such a vast quantity of lumber as one of those trees contain. But should the greed of immediate possession overcome the more far-sighted and enlightened policy of protecting our great heritage, it will be a sorry day indeed for California and result in the loss of millions—millions, not of sentiment nor in simple pride that one can stand and boast that “We have the largest trees on earth!” but millions of hard dollars.

“But why reduce the consideration of those noble friends of ours to such a sordid basis? Is not our love for the Sequoia of the Sierras, or the oak of the hills, or the sycamore of the valleys and cañons, sufficient to protect them?”

Too often it is not. Within a stone's throw of my home, I can look down on hundreds of fine sycamores lining either side of Arroyo Seco; yet often I can hear the ax claiming the gnarled old giants for a few more cords of stovewood for the owner too ignorant to appreciate the great patrimony he is sacrificing. And as to the love of the trees saving them, there would be fewer of them to-day if that were the only consideration.

Let me illustrate: A few years since the temperance, or so-called prohibition, sentiment began to be agitated in many southern California towns. Year after year a campaign more or less hysterical, with “Ten Nights in a Bar Room” scenes and strong appeals to sentiment and sympathy, was waged, with indifferent success on one side, then on the other.

But, presto! It was discovered that the town without the saloon was securing a class of people which all towns wish to secure to help upbuild and make them move in step to the twentieth century swing. That moment the appeals to sentiment and sympathy ceased, and a cold-blooded consideration of wiping out anything inimical to the best

financial interests of the town began to win favor and win votes, and the suddenness with which saloon changed to no-saloon towns surprised all.

"What is there in it?" is the question which springs to the lips of every American.

Now then, what is there in it for California if she will protect her few trees and, more, if she will plant for the future? To the more observing the answer is plain. To all it is plainer than it was a few years ago. But possibly we may get an idea from a few minutes' discussion.

The cities recognize the drawing power and the absolute necessity of trees in their parks. The beauty spots have a drawing power for all. The farmer's son visits the city and becomes fascinated with its life and the value put upon things beautiful. It appeals to him. The farm home too often has a barren waste about it. There are other features which draw the boy from the farm, but if farm communities join in creating beautiful surroundings, in fostering a spirit of rivalry between each other and in vieing in producing more attractive roadways and home grounds, I believe a great factor will be added in keeping the boy at home.

"Is that a commercial factor to the farmer?" Ask the orchard or vineyard owner who, for want of help, has been compelled to contract with the wily Jap to secure the gathering of his crops.

Again: Imagine an Easterner, a tourist homeseecker, looking over the State—from a car window, as usual—going north through the San Joaquin Valley. He strikes Bakersfield on a warm summer morning about eight o'clock. Nearly all day he rides in that one valley. Here and there occasionally an orchard, but scarcely a large tree visible from the car window. The mountains to the right show in the dim distance an occasional cap of snow. To the left the Coast Range is so low on the horizon as to be almost invisible. The great expanse is in many places almost as unbroken as the surface of the sea.

The appearance of a eucalyptus grove or a solitary tree wins his eye almost as quickly as a passing ship in midocean. He is ignorant, perhaps, of the great wealth-producing power in that section of the raisin, the peach, alfalfa, or the dairy, or that over against the hills are productive orange groves. Before these facts can be impressed upon him, he becomes unconsciously prejudiced against the section through which he is passing, and one who would have been a strong factor in the upbuilding of California may go home to influence others against our State.

California, with its brown fields—brown the greater part of the year at least—demands more attention as to the breaking up of the landscape, especially in the larger valleys, with trees so far as possible.

If each home-maker would realize this, and instead of planting fruit

trees clear to the foundation of his house, with vineyard perhaps in his front yard, and in their stead plant here and there a large growing forest tree, which, as a rule, is far less subject to pests and diseases than the fruit tree, he would surely add greatly to the natural beauty of his neighborhood and by that means attract to it a class of people believing as he does in having things beautiful surrounding them. All of which creates a greater demand in others for that same property. This, in turn, begets greater care in orchards and vineyards, which in turn brings greater wealth. Like begets like, so that greater care and attention to ornamentals brings its further demand of better care to the producing part of the ranch.

What to plant, how to plant, where to plant, are important questions, but not within the realm of this talk. Only permit a hint. Don't strain after strange or unknown or expensive trees simply because they are such. The eucalypts have proven themselves wonderfully adapted to our State. On my own place I have planted an occasional sequoia, live oak, maple, or other slower-growing tree. But the masses and general effects are made of eucalypts, peppers, and acacias. My children's children may point up to the sequoia which I have planted, but while it is growing a few inches, or at best a very few feet, in my lifetime, the common eucalyptus will grow to be a monarch.

Don't let the idea prevail that the common things with which we are familiar about us may not possess great beauty.

If wealth permits the introduction of strange or new trees, let such service to the State be encouraged. But this appeal is for the lowliest of us to plant some trees in the home croft—trees which will add to the attractiveness of our State, to our own comfort at noonday—

"And the night shall be filled with music,
And the cares that infest the day
Shall fold their tents, like the Arabs,
And as silently steal away."

THE CHAIRMAN. We will now have the paper of Mr. J. H. Reed of Riverside, on the "Importance of the Careful Handling of Fruit."

IMPORTANCE OF THE CAREFUL HANDLING OF FRUIT.

BY J. H. REED, OF RIVERSIDE.

My subject, as it appears on the program, seemingly covers fruit-handling in general. While I believe the needs for the best preservation of fruits after leaving the trees are largely alike to deciduous and citrus, I would not presume for a moment to discuss the former here at the north. I know too well the worldwide reputation the fruit-growers of central and northern California have justly earned for not only producing fine fruit, but also for wisely handling it. Last year I visited many of the Middle and Eastern States. Wherever I went, at every

fruit store and every fruit stand, was the prominent placard, "California Fruits." Near by a bushel basket full of Michigan peaches would be a little carton of California fruits, both labeled at the same price. I was proud of California deciduous fruit-growers; in fact, was almost inclined to lie a little and insist that I was a northern California fruit-grower myself and had a hand in producing the splendid display before us.

Of orange-growing up here I only know that we at the south hear so much of your success that we begin to look to our laurels. If in the little story I have to offer of a matter that is proving of exceeding importance in the handling of our oranges at the south, there may be anything of value to you northern growers, I shall be pleased.

I shall not go into a general discussion, but by a brief object lesson strive to enforce the importance of careful handling, and of knowing how.

Our southern California orange industry, during its brief career, covering, as it does, but about half an ordinary lifetime, in which it has grown from practically nothing to an annual producer of some \$25,000,000 or \$30,000,000 in value, in the main has developed gradually. But there have been a few errors of special growth, because of important newly discovered methods in culture or marketing, quickly put into practice.

Though some of us at times have been somewhat impatient at the tardiness with which improved methods have been accepted in general practice, probably there has been no agricultural industry that has developed with more rapid and substantial progress than our California orange-growing. Men who came to California in middle life, taking part in the commencement of the industry, and in all its varied progress since, are yet actively engaged in the business.

With its financial prosperity, its attractive features as an occupation, and the esthetic effects of its orchards, giving a distinct characteristic to the country, it has attracted to it intelligent men who have put wealth and enterprise into the development of the new and interesting industry with such success that it is now the acknowledged basis of the phenomenal prosperity of southern California. While, for the most part, the development and progress of the industry have been gradual and continuous, it at times has received special impetus from important discoveries which materially increased its prosperity and promise of its permanency. Of these the introduction of the seedless orange was the most important, at once bringing our California fruit to favorable attention, and securing for it a permanent, growing market.

The early organizations of coöperative methods of marketing, by which now over half the entire product is marketed through a single agency, marked a distinct era in the industry. It materially modified

methods even of packing firms that do not affiliate directly with the cooperative exchange, placing the marketing generally on a more substantial basis than ever before.

While from lack of exact knowledge, which comes only from scientific investigation, we are yet plodding along with guesswork largely in fertilization, the recently introduced cover crop is proving the most important step yet gained in producing economical plant food and soil health for our orchards, and will mark another new era as distinct in orchard methods as cooperative marketing has in marketing methods. And it should be mentioned in this connection that the general and rapid introduction of this tremendously important factor in fertilization is largely due to the intelligent and persistent advocacy of one man, Mr. James Mills, of Riverside. Had Mr. Mills rendered it no other service, this alone would have the entire citrus industry of California his debtor.

But of all these special advanced methods in orange culture and marketing, which have meant so much to the success of the industry, none effected so quick and radical changes, with the promise of so far-reaching, as well as immediate important results to the industry, as the investigations of the Washington Department of Agriculture during the past three years into causes and prevention of decay of oranges in storage and transit are now doing.

Up to three years ago, the effort of progressive orange-growers was the economical production of good fruit. But little attention was paid to handling. When the fruit was ready for marketing, it was, as a rule, roughly gathered. Men, paid a small price per box, were set to picking. The work must be hurried to make reasonable wages. Little attention was paid as to how the fruit was parted from the tree. The fruit was often dumped from bushel sacks into the boxes, hauled on springless wagons at a trot over rough roads, exposed to the hot sun and dust, to the packing-house, where after rough handling of boxes it was put over grading machinery, usually of a character that treated the fruit as harshly as did the human handlers, then packed in heated cars at the high temperature at which it came from the field, and started across the continent on its ten days' to two weeks' trip. It is true there were orchardists who handled the fruit more carefully than this description would indicate, but they were not the rule. At the packing-house, ordinarily, identity of their fruit was lost to growers. The vast actual shrinkage from decay, often of from five to sometimes forty per cent, when the fruit was opened at its destination, was seldom known to them, or if quoted it was little heeded.

This enormous loss to the industry which had been sustained during all these years had been little realized by the majority of the producers, and those who had given the matter attention, for the most

part looked upon it as a sort of necessary evil—a loss unpreventable. But some who had calculated the tremendous total loss to the industry, if continued from year to year, and especially when marketing conditions became less favorable, as sooner or later they necessarily must be, by reason of increased competition and the largely increased product as indicated by the rapidly increasing orchard acreage here at the north as well as with us at the south, led a few men to cast about to see if something could not be done toward at least lessening this enormous leakage from growers' profits, amounting to several millions annually.

The Department at Washington was finally appealed to. After much solicitation Dr. Wm. A. Taylor, pomologist in charge of field investigations of the Bureau of Plant Industry, came over to look into the merits of the request. He recognized the trouble as one of sufficient importance to justify immediate investigation by the Department. Mr. G. Harold Powell, special expert on life of fruits, who had rendered invaluable service to the great winter apple industry of the country by his investigation into effect of cold storage and intelligent handling, was sent to the Coast to look into the orange-decay trouble. It would be too long a story to go into the particulars of his three years' investigation, and I can but summarize his methods and results.

Mr. Powell was unacquainted with citrus fruit handling, but his training as an expert investigator, and his study of the life of other fruits after being parted from the tree, put him quickly on the track of conditions that he thought might have to do with causing decay. These leadings he followed up most carefully, repeating every test over and over, under various conditions, till he was absolutely sure of his conclusions.

He found that the delicate exterior structure of the orange was easily injured. He demonstrated by repeated experiments that damaged fruit was more or less subject to decay, according to the degree of heat and moisture to which it is subjected. He also demonstrated, beyond a question, that uninjured fruit under fairly favorable conditions is practically immune from decay. Then came the question, Have we been allowing our fruit to become injured in the handling? To this inquiry Mr. Powell addressed himself with the same keen, systematic persistence as he had to finding the law of fruit decay. He went into the orchards and scrutinized the work of picking and other orchard handling. He kept this up week after week in various orchards in many different orange-growing sections, and then reported the astounding fact that a large percentage of our oranges was habitually more or less damaged in the handling. Careful growers could not credit this till it was shown to their own eyes.

On close examination from ten to forty per cent of the fruit was shown to be damaged by the clippers, by punctures from long stems,

by gravel in the boxes, etc. This condition was found in all the orange-producing sections. In some orchards more, in some less, but there were no entire exceptions.

It was a matter of no little humiliation to some of us who had prided ourselves in knowing something about oranges and their careful handling. But there was no gainsaying the facts. Mr. Powell would take the doubter to his own orchard and have him examine the work of the pickers for himself, calling attention to the damages which had heretofore escaped him. Most of them slight, it is true, but sufficient to leave the fruit vulnerable to the deadly fungi. To be absolutely sure of this, Mr. Powell would select, from the same lot of fruit, enough of the damaged to fill several boxes, and of the apparently undamaged to fill other boxes, place them for two weeks subject to the same conditions of heat and moisture as they might be subject to in a close car. On examination, every fruit in the boxes damaged would be found in some state of decay. In the case of the uninjured, there might be here and there a decayed fruit, but in every instance on close examination the decay would be found centered around a mechanically damaged point so obscure that it was overlooked when put in. The balance of the fruit would be found as sound as when put in the box.

Growers who carefully watched this investigation were amazed to see how quickly and easily Mr. Powell demonstrated these simple facts of such tremendous importance to our industry.

Here, then, was the key to a cause sufficient in itself to account for an annual loss of from five to twenty-five per cent of the value of all the fruit we sent to the markets, which had largely escaped our attention. The matter was now up to the grower. Was it practicable to gather and deliver this fruit undamaged? As to this, opinions differed. Many were doubtful whether the old methods and practices could be materially modified in any large way. Some of our more enterprising growers, who packed their own fruit and had followed the experiments and demonstrations closely, took this matter up seriously, and insisted on careful methods from the orchard to the packing-house. On careful tests it was quickly found that radical improvement was being made by such. From orchards where an average of ten to thirty and more per cent of damaged fruit had been found, the injured was reduced to two or three per cent, and in some cases to less than one per cent. A remarkable change. These more careful methods cost something. Piece work in picking was changed to day work, and the persistently careless dismissed. The expense of picking and handling to those who succeeded in practically eliminating injured fruits was materially increased, some reporting it to be doubled, but a cent or two a box was but a slight fraction of the gain.

Mr. Powell now turned his attention to the effect of cleansing, sort-

ing and packing machinery at the packing-houses. That injury to the delicate fruit was done here, he was satisfied, but to demonstrate how serious, and how it was to be remedied, was a far more difficult problem. A bruise from impact as the fruit passed through complex extended machinery was more difficult to detect, and the effect of the brush and of washing on the delicate surface oil cells difficult to determine. Here is where the value of the trained expert came in. For two years Mr. Powell with his trained scientists followed up these matters, till practical results were clearly demonstrated. This importance can be best estimated by the fact that radical changes were at once made in many packing-houses.

In the meantime the effects of the high temperature in the cars when the fruit was loaded was given careful attention. In a cool dry atmosphere even an injured fruit will carry a long time before showing signs of decay, and an uninjured indefinitely. The effect of loading fruit already at a high temperature from warm packing-houses into uncooled cars was carefully watched, compared with fruit that was delivered without being heated and kept as cool as practicable till loaded in the car, and again with fruit artificially cooled down to 35 or 40 degrees before loading, was carefully tested with marked and significant results. These experiments were carried on with the greatest care and repeated until there was no possible question of the reduced amount of decay when the fruit was started on its long journey at a low temperature. For two seasons, scores of test cars were sent on under these varying conditions as to temperature when started, often with an expert attending the train, carefully noting the temperature at frequent points, till it reached its destination.

In making these tests the transportation companies granted every facility desired, sometimes at very considerable expense to themselves, to make them as decisive as possible. This work went on till the law controlling the effect of temperature of fruit at its starting on its carrying ability was determined, and it was found to be a matter of very great importance. It was clearly demonstrated that precooled fruit opened at the other end with much less decay than that without precooling, and that fruit handled with special care to keep it from being heated, even without being artificially cooled, had material advantage over that allowed to become heated before being loaded.

While this matter of conditions in transportation resulting in least decay in the fruit on its arrival may be quite out of the control of the grower, it is of vital interest to him. Even if he sells his crop on the trees, the dealer can and will pay more for it if he has assurance, from its being carefully handled, that it will reach the market in sound condition. But it is to growers who have an interest in their fruit till it is sold, that this careful handling more directly appeals.

As to the actual value of this careful handling to the grower, it is difficult to definitely determine. It has been estimated by those who are in position to judge best in the matter, that the aggregate saving to orange-growers during last season, because of the more careful handling induced by these investigations, exceeded \$1,000,000. A more definite notion may be had from actual individual experience.

Mr. L. V. W. Brown is one of our large Riverside growers who packs his own fruit. He was deeply impressed with the value of careful handling as suggested by the result of Mr. Powell's investigations, and during last season rigidly insisted on his fruit being handled with the greatest care. Mr. Brown tells me that he estimates his net increased receipts from his product of last season, because of this special care, at from 50 cents to \$1.50 per box.

The National Orange Company also of Riverside (The Chases) were among the first to give careful attention to Mr. Powell's investigations. They quickly recognized the practical value of their results, and at once had both packing-house and orchard handling regulated accordingly, at a considerably increased expense over that of old methods. But in spite of this increased expense, they estimate the net gain from it as much as that claimed by Mr. Brown. They found that their carefully handled fruit, even after warm weather commenced, was carrying fully as well without icing as the ordinarily handled fruit with icing, and icing their fruit was not commenced till six weeks after, that of most shippers. The margin of saving on two or three cars per day on this alone was very considerable.

Many other cases where equally large gains were made could be cited. These cases, of course, simply indicate the *possibilities* of adding to the orange-grower's profit through the results of careful handling.

Of course, the advantage in utilizing the new methods is considerable with the large grower packing his own fruit, or firms having entire control over all the fruit they pack from the time of picking. But after following these investigations from the first, as well as the application of their results in a practical way, by many houses giving them careful test, I am satisfied that at least 50 cents per packed box may be saved to the *small* grower by this careful handling, where so coöperatively associated as to have it rigidly carried out; that is, a net gain of \$500 to the grower of every one thousand packed boxes. I firmly believe that this increase of net profit, 50 cents per box, to California orange-growers is entirely practicable; but to be quite safe in our estimates, place the gain at 25 cents per box, one fourth the amount that has actually been secured over old methods, and we see how tremendously important these investigations may be made to our California industry.

Supposing the associations making up the California Citrus Fruit Exchange, which will probably pack four million boxes or more this

season, should all carry out these reforms in handling, as many of them are preparing to do, here would be \$1,000,000 added to the net profits to be distributed to their patrons. The same advantage may be secured to the patrons of independent packers.

It is sometimes claimed that agriculture is the slowest of all occupations to avail itself of demonstrated advanced methods. This certainly has not been entirely true of our California fruit-growers, and I think it remarkable how quickly and vigorously the demonstrated value of careful handling of our orange crops is being appreciated and utilized.

Much of this fruit will be gathered this season and henceforth by careful picking forces working immediately under trained supervisors. It will be delivered to the packing-houses in the most careful manner, and there handled by men and machinery best adapted to secure it from any injury. Already many packing-houses have been and are being entirely refitted to secure the object suggested by the investigation, even at the cost of laying aside expensive machinery and appliances and putting in new. The fruit will be shipped as quickly as possible after being picked, and, where possible, cooled before shipping. Where this approved method of handling is not used, the grower will continue to lose a possible margin of income equal to a fair profit in itself.

I recognize fully the importance of our orange-growers applying themselves most diligently to the solving of our marketing problem, to the improving of our orchard methods, to the more general and intelligent use of cover crops, and other means of bringing the soil into the best condition, to the rigorously shutting out of new insect pests and finding better means of freeing our orchards from those already preying upon them. I recognize, too, that there are other things than careful handling that have to do with the keeping qualities of our fruit, but I do not think there is any one thing to which we growers can address ourselves with so large and immediately profitable results, just at this time, as that of securing the careful handling of our fruit.

THE CHAIRMAN. Does any one wish to discuss the paper just read or ask any questions regarding it?

MRS. GAGE. Mr. Chairman, I would like to ask if there is any one in this Convention who knows anything in regard to the experiment of packing fruit in the paper package? I understand that the great burden laid upon our fruit-packers by the high price of material is going to be circumvented by a paper package, and I understand it has been tried in the Southland.

MR. REED. Several different kinds of packages have been introduced. I am of the opinion that there will be improved packages for carrying our oranges. We have now being manufactured a board box that promises well, but I can not say that any other packages but the ordinary packages have been successful.

MR. KING. In my limited experience in the citrus fruit country and so far as my observation goes, after reading very much about the conserving of the fruit after it is grown, I have seen a great deal of discussion as to the methods in the packing-house and about the handling in the orchard. It seems to me that one of the most fruitful sources of injury to your fruit is the picking shears used in all the orchards—certainly in northern and central California. The only shears that I have seen have two very sharp points. They are so sharp that they will injure the picker if he is not careful. I think ninety per cent of all the oranges clipped from the trees are not in sight of the picker. I do not think that he attempts to look at it as he puts his shears on the stem to cut it off. I believe it would be a wise thing for this Convention to discuss and suggest to manufacturers that a better shears than are now provided can be had, and I do not think you would have to go a very long way to get an improvement and thereby save a very large percentage of the injuries which you have in your picking.

DR. SHERMAN. Mr. President, I would say that this seems a little new and strange to me, if they have not orange shears up here. All through southern and central California they are to be found, and they are a little shears with a round end. They are about six inches long and they are kept in all the hardware stores in central California.

THE CHAIRMAN. I will say to Mr. King that in the south he can find half a dozen or perhaps more different varieties of shears for preventing injury to the orange. I have three in my old desk in Los Angeles. Three different patents were presented to me to show the farmers, and there are at least six different patents. I would like to ask if any one can answer Mrs. Gage's question.

MR. MILLS. I will answer it in a measure, but I wanted to ask a question first. Do I understand that you do not use clippers in picking your oranges in northern California?

MR. KING. Yes, we do. They cut them off, but the shears are so sharp at the point that they puncture the oranges.

MRS. RANSOM. We have some improved shears.

MR. MILLS. You have as beautiful oranges up here as are grown any place and there is big money in them. The box question is a very serious one. It confronts all of the growers in the south, confronts them now, because of the syndicate doubling the price of boxes in a year or so. The association that most of us belong to down there had contracts with the syndicate ahead of time and we were able to get our boxes for 10 cents each less than the independent growers last year. This year these coöperators have resolved to set aside a certain sum of money taken from each box of fruit, to be put into a fund to purchase for themselves the forest trees and to cut them and put up mills and manufacture their own lumber, if those who own and control our great forests continue to raise the price on us.

A gentleman by the name of Ruggles, I think, at Redlands, is experimenting now with a leather or papier maché box—both of them. We believe that he has the solution of the difficulty and that he will be able to give us boxes that are better than the board boxes—that come folded and can be opened up like the paper sack in the store when you go to buy ten pounds of sugar, and can be shipped and refolded and shipped again or resold. We find that there is a great possibility that we can sell those boxes in the East for almost what they cost us, after the fruit has been sold, and that it will largely affect the cost of the packing of the fruit. That solution is here. You need fear none of those things. The American intellect will solve everything, and we will make them out of sunbeams if it is necessary.

MR. CRANDALL. Mr. Chairman, would a resolution be in order now?

THE CHAIRMAN. A resolution for the Committee on Resolutions would be in order. You may read it.

Mr. Crandall read the following resolution:

Resolution in Favor of Woman Suffrage.

Inasmuch as our women horticulturists and agriculturists, many of whom are preeminently successful, have to bear their full proportion of the expenses of government without voice in the passage of laws or selection of governing bodies and public officials;

AND WHEREAS, The average of intelligence, ability, and patriotism is as high among women as among men; be it

Resolved, That the fruit-growers of California, in annual convention assembled, hereby register their sentiments in favor of the right of suffrage for women on equality with men, and urge the early extension of that right to the women of our State.

THE CHAIRMAN. We will now have the report of the Committee on the Governor's Address.

The Secretary read the report as follows:

Report of Committee on Governor's Address.

Your Committee appointed to report on the Governor's address to this Thirty-third Convention of California Fruit-Growers much appreciate his expressions of interest in the well-being of California's greatest industry.

His timely reference to the importance of better, quicker, and cheaper transportation induces us to hope that he may cast his influence in favor of a modern parcels post, found so efficient in other countries.

We commend the broad and liberal views taken by our Governor in his promise of support for any needful appropriations. We believe, if judiciously and wisely conducted, the State Farm at Davisville, will be a potent factor in inducing better farm practice. At the same time, in the best interests of the agriculture of the future, we express a hope that, apart from expenses undertaken on behalf of research and experimentation and the salaries of the professors, the actual farming operations may show some margin of profit, thus encouraging the youth of our country to follow methods of economy and thrift.

EDWARD BERWICK.
F. W. CRANDALL.
R. P. CUNDIFF.

MR. BERWICK. I move the adoption of the report.

The motion was duly seconded, and on vote adopted.

THE CHAIRMAN. We will now hear Mr. J. A. Filcher on "The National Farmers' Congress and its Work."

THE NATIONAL FARMERS' CONGRESS AND ITS WORK.

By J. A. FILCHER, OF SACRAMENTO.

Mr. Chairman, Ladies and Gentlemen: I have felt extremely diffident in regard to taking up your time, as I feel that the subject assigned to me is somewhat foreign to your immediate interests. It might possibly be interesting to sit a little while and listen to something about the Farmers' National Congress and its work, but you are directly and intensely interested in the State of California Fruit-Growers' Convention and its work. It has been with me, on previous occasions, a theme to discuss foreign markets for California produce, and on that subject I have felt conceited enough to believe that I could suggest some ideas of interest, and while I shall speak off-hand to-day in the few minutes I shall occupy your time, I am going, after briefly indicating something about the Farmers' Congress, to switch off onto the general education of a farmer.

The Farmers' National Congress which I had the honor of attending a year ago at Rock Island, Illinois, in my judgment is one of the most thoroughly representative bodies that assembles in America. Until identified with it, I had no idea that we had on this continent a body which met annually so completely representative as the Farmers' National Congress. Its accredited delegates number about one thousand on an average, and they impress me as thoroughly representative men from several states of the Union; and being largely of a voluntary character, in their representation they necessarily include men of public impulse, energy, and enterprise. They are appointed, to be sure, by the Governors or by representative bodies of the different states, but it is only those of self-sacrificing disposition or of public energy who may feel able to attend. This Congress, which usually holds its session about one week—and which, by the way, wants an excuse to come to California—takes up all the subjects—I was going to say of interest to the farmers—of public interest to the people of America. If you will allow me, I will enumerate briefly the subjects acted upon favorably at the Congress a year ago, and the first subject considered was the teaching of agriculture, horticulture, and domestic science in the schools of America. I obtained a great deal of inspiration from the discussion of this subject in that Congress and awoke sensibly for the first time to the fact that, as a people, particularly in California, we are deficient in this particular branch. The opening, the dedication, of the State Farm is a new and wonderful stride on our part in the direction of overcoming these defects, and I believe through that we will

eventually recover much of the ground which we have heretofore lost, compared with our sister states.

They took up and discussed and have favorably considered the parcels post and the postal savings bank. They believe in and have determined in favor of not only a fine but imprisonment for managers of corporations who violate the laws of their country, taking the ground that an ordinary fine on a large trust or corporation is inadequate punishment, and that the only way to create terror of the law among those people is to throw the offenders into prison. They believe in and have favored the initiative and referendum in politics, and I believe, ladies and gentlemen, after listening to the discussion, as I have, among those people who have given thought to it, that it has many features of merit, and I am impressed more particularly with the merit of the referendum in the city of Sacramento, where I live. They have adopted, in the charter of that city, the privilege of referring questions to the people which may be refused or defeated by their elective officials. Not long ago the city trustees refused a franchise for certain rights of way for the Western Pacific through that city. The matter was referred, under the law, under the referendum, to the people of Sacramento City, and they voted twenty-four to one in favor of what their trustees had denied; and where twenty-four people to one desire a thing it is evident that they ought to have it, and it is evident also that their elective officers were not in sympathy with the desires and demands of their constituents; and hence those constituents in this case were saved to themselves by the referendum.

They also believe in and have favored liberal reciprocity treaties looking to the enlarged consumption of the products of the American farmer in foreign countries; and I believe a policy of that character, which might with consistency be advocated by the fruit-growers in convention in the State of California, looking to modifications of our tariffs on farm and orchard products, marketed one country with another, would lead to a great increase in the consumption of our products. And while on this subject I want to say that the world is hungry for what you produce, and I want to repeat what I have said before, that if the horticulturists or agriculturists or fruit-growers of California were organized into one corporate body they could spend, and be justified in spending, perhaps \$100,000 a year out of their aggregate income to exploit the markets for their products, and they would make money by the operation. Corporations organized to place some single article of food product on the market, whether it be a breakfast food or a baby food, spend a large portion of their income in advertising and exploiting the merits of that product. Why, in the jungles of Africa and the prairies of Siberia you will find on every rock "Mellen's Food," and Mellen's Food was started in a hole in the wall in Boston with \$500,

and to-day it represents a capital of fifty millions. If a corporation could do that with Mellen's Food, what could you do with California's luscious fruits?

I took a few of these fruits to Germany and showed them to the people there, and the importers and dealers came and asked, "How can we get some of that fruit?" I didn't have to go to them and make appointments and beg for an audience, but men with millions at their back came and sought an audience with me, begged me to dine with them, that they might impress me with their substantiality, reliability, and efficiency in handling these goods if they could by any means obtain an agency for them. It is an old story, but you know it. I had to send to Liverpool for samples to cook and give away, and I had to send for more to be put in a store to be sold at my account, so I could say on a card they could be had in Germany; and from nothing we made a business that amounted, in probably one year, to seven hundred carloads; and no less an authority than Philo Hersey, President of the Fruit Exchange of Santa Clara Valley, remarked in a State Fruit-Growers' Convention that the amount of our dried fruit in that year, 1897, was excessive and the price threatened to slump below the profit line, but that this unexpected demand from across the sea stiffened the prices and made the crop profitable, and, as he expressed it, it probably increased the price one cent a pound. If it did, it meant \$1,500,000. If it stiffened the price one mill a pound it meant increased receipts of \$150,000, and all at the expense of \$6,000. That was in one small portion of Germany. The historian, Von Stephanie, begged me to take those samples into Austria. He said, "You can get a great trade there." The Russians said, "Why do you come to Germany? Come to us." The Englishman said, "We are your best customers; why don't you bring them to our country and show our people what splendid things you have got? We would buy all you have." When I came home and reported these facts to the State Fruit-Growers' Convention in California they were impressed by it. They believed that that work ought to be continued, and Mr. H. Weinstock rose in his seat and said, "This work ought to be continued and we ought to raise the money right here to do it with, and to start a subscription I will give \$500." They appointed a committee, with Mr. Russ Stephens as chairman, consisting of one member from each county in the State, to raise \$10,000, and they were getting along swimmingly with the work when the "Maine" blew up.

MR. STEPHENS. I will state that we had over \$8,000.

MR. FILCHER. Some day it ought to be taken up and revived. The market is there and the world is there, and I want to tell you nobody ever had too keen a demand for the things he is producing. That will bring our Eastern patrons up to a sense of the fact that we

don't have to depend upon them, and then they will come here and beg you to sell them your goods.

The Farmers' National Congress objects to free seed distribution, and by a resolution of my own they took the ground that the money expended in the purchase and free distribution of seeds to the farmers of America would be better used in maintaining or increasing the exploiters in foreign countries for such articles as might be adapted to our country, and the idea was suggested by them.

In my perambulations I have found certain things that I thought would be good for California. I was fortunate in making the acquaintance in France of Mr. Bourson, secretary of the national fruit association of that country, and if there is any country in the world that believes they are *the* fruit country, it is France. They are not willing to concede to us the prestige to which we are entitled. They know what they do themselves and they believe they are the only country that is worth considering. Mr. Bourson is a very important officer and his acquaintance was a great favor to me. The gardens of that country are surrounded by high walls built of stone or concrete with a lot of broken bottles on the top to keep the boys from climbing over, and big iron gates, locked, and it would have been almost impossible for me to obtain an insight into that without the sesame or passport which Mr. Bourson carried. I was able to visit the grape sections, the wine sections, the olive sections, and the prune sections, and even to get into the prune packing-houses, something very few people are able to do. Among other places was the estate of Baron Rothschild, about thirty miles from Paris, containing fifty thousand acres, and half of it as completely virgin as it was when Cæsar occupied that country and devoted it to all kinds of game. The pheasant and the wild boar come out in the evening to feed, and when frightened run back into the forest. But I went there to see fruit-growing in the high style of the art known to the French horticulturist. Among other things I found a new raspberry just being propagated. They have Burbanks over there—not quite so prominent, but they do things sometimes. That raspberry was bearing that year for the first time. It was nearly as big as my thumb, three or four times as big as ours, and apparently as rich in flavor and as bright in color, and it occurred to me that it would be a good thing to introduce it into California.

When I was at Fontainebleau, the great table grape section, I was shown the famous Duc de Voisart. It was the biggest grape I ever saw and it was as handsome as it was big. I only tasted one. I asked the privilege of tasting that grape, and the party looked around to find a deformed bunch and handed me one with a look as much as to say, "Eat a little and hand the rest back." I ate it by pieces and was satisfied with its flavor. There might have been one defect; it seemed

to be rather thin-skinned, rather transparent, but, like some women, it was a fine looker. After a great deal of tribulation I got some of the vine of the grape and some of the raspberry and Mr. Bourson promised to send them to me. Believing I knew the French character well enough to doubt whether I would get the vines, I sent him \$20, and I knew he would not send it back and that he would send me some vines, and he did. I turned them over to Mr. Maslin. I don't know whether Maslin knows his business or not, but he couldn't make them grow. I believe a great many good things could be picked up in that way that would mean a great many dollars for California.

THE CHAIRMAN. Mr. Sprague will now speak to us on "Improvement of Inland Waterways."

IMPROVEMENT OF INLAND WATERWAYS.

BY A. R. SPRAGUE, OF SACRAMENTO.

Mr. President, Ladies and Gentlemen: When the Chairman asked me how short my paper would be or of what length it would be, I told him he might make it long or short, according to the necessities of the occasion, inasmuch as I should speak from carefully prepared notes, but that the subject, it seemed to me, was so important that it demanded a very general discussion. We are very fortunate, indeed, in President Roosevelt's administration in very many ways, and in none more than his large grasp of affairs. He is not a man who is satisfied to follow along in the narrow groove of precedent, and in no other particular has he demonstrated this more completely than in his treatment of the subject-matter of waterways. You know the history of the river and harbor bills for years and years. It has been the custom for each locality to lobby for an appropriation for its particular creek or river, quite regardless of the real merit of the plan. If the representative was successful in securing a large appropriation for his district, he was considered to have served his people admirably. President Roosevelt, in common with many other citizens, had got tired of that thing, and so, something over a year ago, when the subject was presented to him, he determined to find out the facts in regard to the improvements of rivers, in regard to all of the complex problems involved in the improvement of navigable waters, and so he appointed a commission which is known as the National Waterways Commission, to take into consideration the whole problem connected with the improvement of navigable waters. We were fortunate in having a large portion of that commission present at the National Irrigation Congress, which, as you know, convened in Sacramento a few weeks ago. In order to confer with that commission

and forward its work, especially in California, a committee was appointed by the California delegation to the National Irrigation Congress, a committee which should be known as the California Waterways Committee, and I have the honor to be secretary of that committee. I make this explanation of the reason for this particular subject on your program to-day.

It has been discovered, by the investigations of these gentlemen who have gone to different portions of the United States studying the question of the improvement of waterways, that it is a complex problem. You can not properly deepen a river unless you do a good many other things, and here in California they said, "You have the very ideal situation for the work of such a commission. You have here all of the problems involved." If you deepen the waterways you must do that in harmony with natural forces. The stream itself must scour out a large part of the débris which has accumulated there. Consequently there must be levees erected to confine the stream within its proper channel, in order that it may gather force and scour out its channel. This was demonstrated, in the first place, in the Mississippi in such a wonderful fashion that it has vindicated that method for all time. But in the presence of such vast volumes of water as roll down the steep mountain slopes of California in times of flood, levees and channels and other such things are utterly disregarded. You must do something else. You must make arrangements in those natural reservoir sites back in the mountains to hold back a portion of this great flood until it may pass safely down along the channels, natural or artificial. Consequently you must not only dredge the channels, but you must erect levees, you must store the floods.

Now, then, in order to diminish as much as possible the danger from flood, you must see that your mountain slopes are covered with the native vegetation, the brush and the trees that nature placed there, instead of allowing them to be denuded by the wasteful processes of the lumberman and of the sheepman. Secondly, then, this introduces, in addition to these other problems, the problem of forestry, the preservation of the covering of the slopes of our waterways.

You see, then, we have a very complex problem which this commission proposes that the American people shall undertake. You can not do one of these things effectively without doing them all, and we are peculiarly fortunate that here in California, within our own State boundaries, we have all of these conditions presented, so that it will be a typical plan, a typical instance, for the commission to start with. This problem is a vast one; it is not for California alone, but for every state in the Union, because it means the reclamation of vast areas of swamp land, and those areas of swamp land exist in almost every state. Our irrigation problem, for which we so earnestly solicited the

attention of the whole people, was almost a local one, confined to arid America and western America. But we got the attention of the people of the United States to that. We showed the merchants of Chicago and New York that they were interested. Much more should we be able to show the men of commerce in the East and the Mississippi Valley that they will be interested in this broader plan of proper storage for the purpose of irrigation, of deepening the waterways and of reclaiming the vast fertile acres of swamp land which are now of service to no one.

This is a gigantic problem, but one which may well command the great energies of the American people. The lands subject to flood, as you know, are the most fertile lands that exist anywhere. From the nature of the case they are lands situated near to natural waterways where transportation will be cheap.

There are two main things essential to the development of a country. The first is an abundance of fertile land, to be had cheap. The second is cheap and abundant transportation. A thing that has already interested this Convention in the previous sessions this year is the question, "What can we do to secure better transportation?" You have been told by officials who know, that you can not have that better transportation because the present railway systems are gorged with traffic. That is not so alone on the lines of the Southern Pacific leading east and south, but on their connecting lines as well, as is well shown by the waybills received after our cars of fruit have gone to Boston and New York and elsewhere; those Eastern connecting lines are also gorged with traffic. J. J. Hill, than whom there is no better authority, has said that the transportation companies would need to spend billions of dollars in the immediate future in order to provide railway facilities sufficient to carry this vast product which these prosperous years have brought to this country. We know it is utterly impossible to so expand railway construction in a few years. Roads could not be built, even if the money were provided to build them. Consequently, the problem comes up to us of doing what other nations, in Europe and other places, have done, namely, improve our waterways, thereby making it possible to convey the heavy traffic in which time is not necessarily a matter of importance, and let the traffic like fruit and other perishable products and general merchandise go by the railways.

Now, in this proposition which is submitted to the American people, you have exactly that element, the improvement of the waterways, as the principal question, the principal thing sought, and that is imminent. It is not a thing to be postponed, even for a single year. I see that already a measure has been introduced in Congress looking toward the beginning of this great undertaking. The waters of the East leading to the Gulf of Mexico, the waters leading into the Mississippi River,

and so all the waterways which facilitate traffic east of the Rocky Mountains, as well as our own San Joaquin and Sacramento rivers, should be improved at the very earliest possible time. We can hardly conceive of the traffic which would result from such improvement in the Sacramento and San Joaquin valleys as this project contemplates. The officers of this commission, who have studied the matter very carefully, report that in this great inland valley there will be recovered fertile acres enough to support thirty millions of people in comfort, even in luxury, so great are the possibilities of such improvement as this national plan proposes. And moreover, the incidental benefits to come from this are great almost beyond conception. The water which can be stored in times of flood in these reservoirs, which incidentally will protect from overflow the fertile lands below, is sufficient to produce a revenue, at a lower rate than has ever been given to California users, from the sale of electric power, of one billion dollars per year. Just think of that! And it is cheap power that most promotes rapid improvement and settlement of any country. Give us cheap power as well as cheap transportation and we can beat the world in manufacture.

In California especially rests another advantage which is found nowhere else in all the United States where it is proposed to apply this system of reclamation. We have here a climate which is so favorable to production that we can easily produce two or three times as much from the lands reclaimed from flood as in any other portion in which it is proposed to operate. So that here is another reason why California is very likely to receive the first attention when this great plan shall be brought well under way.

Now, what is our duty in connection with this? This is not going to be done unless the American people get behind it and demand that it shall be done; and so great are our interests here in California, essentially so great, that it demands that all California shall get behind this whole movement and back it; not that we shall start it and ask that our particular job shall be undertaken first, but that our people shall be made to understand the great importance of it all and that we shall be present at every convention where it is possible to influence public opinion, to spread the intelligence concerning this plan and to show that California is united in supporting it. This is inaugurating a new era for California. Heretofore it has been the Sacramento Valley against the San Joaquin, the cities against the country, and southern California against the north. This is a plan big enough to appeal to all, to bring the cordial support of southern California to this plan; all California should spring forward to its advocacy, because southern California can not be great unless this great interior valley be developed, unless millions shall be induced to come here. California, of which we are so proud, has lagged behind in the development of the United

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States. You very well know that in central California and northern California we have but little greater population than we had twenty years ago. During this time empires have been made; Texas has been settled up; the Dakotas have developed into populous States, and Nebraska and Kansas have grown to princely power and importance; therefore with all of the natural advantages which we have here, it is time to put ourselves in shape to invite the populations of the world. We can do so when, added to our wonderful climate, we have this vast body of reclaimed land, matchless in fertility, and cheap water transportation, almost at the very doors of the settlers.

Now a thing like this, an agitation that must aim at so much, must be carefully planned. This talk at this Convention is but preliminary. It will be forgotten, perhaps, to-morrow or next week unless something is done, but it is the business of the people of California to see that something is done; in the first place, that this great plan shall be thoroughly understood by all the people of California. Bring it to the attention of your local press, the editor of your local paper. Get a number of the "Great West," that publication in which these several papers from the Government office were published—November 30th, I believe. Show that to your local editor. Interest the members of your local improvement association. The chambers of commerce should take this up by special meetings and determine that it shall be made a special subject for California. Let California unite in this one thing now, centralize, concentrate, and we shall help to bring forward this great national project which will do more for the American people than anything which has been proposed for the last fifty years. (Applause.)

At the request of President Jeffrey, Mr. King assumed the chair.

THE CHAIRMAN. Are there any questions you wish to ask?

MR. JUDD. Has there been any general plan covering any particular section, or is it a general plan covering all the State that you have got in shape, so that the public will understand where it is and what it is for?

MR. SPRAGUE. The plan of the National Waterways Commission is that Congress shall appropriate, say \$50,000,000 a year to inaugurate this project; that it shall be left to the Government bureaus, as the irrigation projects have been left to those bureaus, after careful examination into the facilities afforded, to determine what project shall be undertaken. And so we want to be particularly careful in California to refrain from urging that this project or that project be undertaken now, but say to that commission or the whole United States, we are content to have this matter inaugurated as soon as possible and when the time shall arrive to determine which project shall be undertaken first we then shall desire to be heard on the merits of the case. We expect that Petaluma Creek and the waterway to Napa and all other

possible navigable waters will receive benefits from this, and the indirect benefits, of course, will come in great power to the cities of the south, where this greater energy will be immediately felt.

MR. JUDD. The object of asking the question was to get some tangible fact whereby different localities could make themselves felt or heard and where to ascertain what to do in order to get this matter in proper shape.

MR. SPRAGUE. The California Waterways Committee meets on the 12th at San Francisco, and we will be glad so see any of you there at the Fairmont; and in the meantime, any correspondence with that committee may be sent to me at my office in Sacramento.

THE CHAIRMAN. We will now listen to "Nut Culture in California," by Mr. Leonard Coates.

MR. COATES. It is a little difficult to come down from these subjects of so great magnitude, such as the canals and waterways and all those things, to a matter of detail in the cultivation of any particular crop. I have endeavored to sift it down, trying to make a few points as briefly as possible.

NUT CULTURE IN CALIFORNIA.

By LEONARD COATES, OF MORGAN HILL.

Twelve years ago the United States Department of Agriculture published a very interesting report on "Nut Culture in the United States," covering very comprehensively descriptions of all species and varieties of nuts then cultivated in this country, giving the various methods adopted and results attained, from the experience of practical men engaged in the business.

A glance over this work at this time, and in view of much added experience, is particularly valuable, expressed opinions in some cases being confirmed, and in others being useful only negatively.

However, nut culture in California embraces only the almond and the walnut as established industries of commercial importance, omitting the peanut as belonging more to vegetable culture, and alluding to the pecan, filbert, chestnut, and pistache as still in more or less of an experimental stage.

In the current Yearbook of the Department is published the article on "Nuts and Their Uses as Food," by Prof. M. E. Jaffa, of the University of California. This forms an exceedingly interesting, instructive, and valuable addition to the literature pertaining to the subject. A study of it can not fail to impress any one with the fact of the rapidly growing importance of nut culture, and the permanent establishment of the commercial product as one of the great food factors of the United States.

Quoting from the chapter on the "Place of Nuts in the Diet," Professor Jaffa says: "It has been shown by numerous investigations that nuts are rich in protein and fat, and that these nutrients can be fairly well assimilated. Nuts being such a concentrated food, their proper place in the diet is a matter for more careful consideration than is the case with many of our ordinary food materials. It must not be forgotten that a certain bulkiness of the diet is conducive to its normal assimilation, and that too-concentrated nutriment is often the cause of digestive disturbances. It might be expected, then, that nuts could be most advantageously used in connection with more bulky foods, such as fruits, vegetables, breads, crackers, etc. Most rationally used, they should constitute an integral part of the menu rather than supplement an already abundant meal. Since nuts are so concentrated, eating a considerable quantity out of hand at odd times will mean an oversupply of food, if a corresponding reduction is not made in other foods. The distress sometimes experienced when nuts are eaten is undoubtedly often due to improper mastication or to over-indulgence. The investigations made at the California station indicate clearly that considerable quantities of nuts, properly eaten, do not cause distress. There is a popular belief that a little salt with nuts prevents the digestive disturbance resulting from eating them. To most persons, salt undoubtedly adds to the palatability of the nuts, but no investigations have been found on record which demonstrate any actual improvement in the digestibility of nuts due to salt."

The *Almond* was the first of the "nuts" to become of commercial importance in California, and, owing to climatic conditions, this State will always enjoy a monopoly in its cultivation. Success, however, has been, from the start, rather uncertain, although added experience, and a record of some partial and total failures, may now be taken advantage of, and mistakes therefore avoided by those who are engaging in the production of this crop. The earlier planted varieties consisted of the Languedoc, imported from France, and the Tarragona, from Spain. These were not generally profitable, and the almond industry languished, until it received a fresh impetus on the introduction of the Hatch seedlings in 1885. Since then other good seedlings have been grown, so that at this time we have, as standard varieties, I X L, Nonpareil, Ne Plus Ultra, Llewelling, Drake, Peerless, and Texas (Texas Prolific).

The almond has been an uncertain cropper owing to its early blooming, rendering it liable to injury during spring storms or frosts, and to the more or less self-sterility of the blossoms of some varieties. To produce varieties, by intelligent crossing, that are late bloomers and self-fertile, as well as of high quality, is what plant breeders should have in mind when experimenting with the almond. The Jordan has

been planted rather extensively the last few years, some old trees of other varieties being grafted in order to hasten bearing. Samples of California-grown Jordan almonds are reported at Washington as inferior to the Spanish product in quality, and the suggestion is here made that seedlings of the Jordan type may be raised in the State that more nearly meet the requirements of the market. I would recommend that Texas, Llewelling, or Drake be planted alternately with the other named varieties to act for them as pollenizers. Just to what extent this will increase the chances of regular bearing is largely conjectural, but there is no doubt that an almond orchard should always be planted in this way.

A mistake has been made in the endeavor to produce almonds with abnormally thin shells, rather than having the quality of the kernel the main object. No good is gained when an almond or a walnut is produced having an excessively thin or paper shell, but the reverse. Rapid eating, causing indigestion, would be encouraged, and nuts, with shells so easily broken, would much more readily deteriorate and become rancid. The almond succeeds best on almond root, and requires a deep, warm soil, or a hill location where a shaly or rocky subsoil permits free access for the roots.

The Walnut.—California produces at the present time about 12,000,000 pounds of walnuts annually, in comparison with which the production from other states is not worth mentioning. The Persian or so-called "English" walnut has been planted in several Eastern and Southern states for more than a hundred years, but it is still considered merely as a curiosity. Its non-adaptiveness to those regions is doubtless due to the great extremes in climate. The tree thrives and bears well in France, England, and other European countries. In the former country selected seedlings have become fixed types for many years, and from these trees others are propagated by the ordinary processes of budding and grafting.

All trees and plants are amenable to climatic influences. Hence, seedlings raised from trees which have been transplanted into a climate where the conditions are less favorable than those to which they have been accustomed, will have a tendency to become hardier than the parent. Plants adapt themselves or become acclimatized to a much greater extent than is generally believed. Take, for example, the two species of eucalyptus, *E. corynocalyx* and *E. rudis*. Both have roundish leaves, changing slightly as they grow older, but the former, being used to a cool climate, carries its leaves horizontally, enjoying all the sunshine it can get; while *E. rudis*, finding itself farther in the interior, under the rays of a hotter sun, swings its leaves over, hanging vertically, to escape injury therefrom and to retard evaporation.

So we find many seedlings of the walnut first planted in California bearing good annual crops of first-class nuts, while the parent trees were very unsatisfactory. Some of these have long been recognized as varieties, such as Santa Barbara paper-shell, Ford's Improved, Placentia, Perfection, and others, many thousands of trees having been grafted from the original ones, but, unfortunately, many more thousand seedlings have been grown, which has resulted in the production of a large percentage of second-grade nuts.

As I have on other occasions stated, it is a grave mistake to imagine that these varieties do not succeed and bear well in almost any good fruit section in northern as well as southern California. The trees first planted, more than half a century ago, in Sonoma and Napa counties, never bore well, and it is claimed the trees were frequently diseased; neither is there any record of their success elsewhere, but only of their selected offspring.

Since the advent of the walnut blight, given a specific name by those who have studied the disease, the theory has been promulgated that some French varieties would be immune, because growth is later in starting in the spring. As this same disease is very prevalent in France, and as these varieties have only been planted in California to any extent for comparatively few years, and are in new, rich soil, there is nothing to warrant the assertion. We need to work out our own salvation in regard to the walnut as in other things, and should not tie ourselves too securely to a record of experiences had under totally different conditions. The best of the California raised walnuts blossom rather early, hull freely, and mature early, being in the sack before the hulls of some French varieties have cracked. The French varieties start to grow later in the spring, and are less liable to be injured by frost or late rains in consequence. But they are very late in maturing as a rule, and are apt to get caught in the fall rains. Growers must choose between the two chances, but, for myself, I would, if possible, determine what walnut trees are the most profitable in a given locality, and plant the same. The blight undoubtedly may be controlled largely by propagating from grafts of the healthiest trees, as well as by careful selection of the root stock, and also by keeping the trees vigorous by the best of care and abundant manuring or fertilizing. There are many details, here barely alluded to, which the successful grower can point out to those in search of knowledge. The walnut requires rich soil and abundant moisture at the root. A climate midway between the extreme heat of the San Joaquin Valley and the fog of the coast line is to be preferred.

Pecan.—The pecan has had no attention bestowed upon it of recent years. The late Dr. Strentzel planted a grove at Martinez, and isolated specimens are to be found in most of the older settled valleys of the

State. The pecan is very often dicecious, which accounts for single specimens frequently being barren. This is a reason why the pecan is so often said "not to do well in California."

While our summers are long, the usually cool nights retard growth, and in consequence the nuts do not ripen near the coast. A rich soil, plenty of moisture, and a hot summer form a combination congenial to pecan culture. The river bottoms of the Sacramento and San Joaquin valleys form an ideal location for this tree. This is no theory, but a statement based on observation, for any one may see the pecan flourishing and ripening good crops of excellent nuts from Oroville, Butte County, to Tulare and Kern. But, as with the walnut, it does not necessarily follow that varieties or fixed types succeeding well in Texas or Florida, will do equally well in California. The conditions being so different, it is more than likely that what is best in Florida would be a partial failure here. Therefore we want to raise our own seedlings, and by selection, produce types worthy of varietal propagation.

I would strongly recommend that the pecan be planted extensively in the interior valley as a street and avenue tree, its symmetrical, upright growth being so much in its favor. A double purpose would then be served, as in the course of time varieties would thus be found suited to our climate and meeting the requirements of the market.

Chestnuts deserve more attention. The European varieties, or those imported from Japan, form highly ornamental trees, and, with the ever-growing demand for nuts as food, they will have added value. The chestnut stands heat well, some of the largest trees in the State being in the Thermalito Colony, near Oroville.

Filberts have not been much of a success thus far, though Mr. Felix Gillet reports them as bearing well at Nevada City. There is no doubt that the nut trees (excepting, of course, the almond), while in some instances dicecious, or bearing staminate and pistillate blossoms on different trees, more often suffer or fail to bear good crops through a lack of simultaneous blooming of the male and female blossoms.

Pistachio.—Pistachio, or green almond (*Pistacia vera*), has been grown to a limited extent in California for many years. G. P. Rixford of Sonoma was perhaps the first to grow the nuts, having a crop from his trees in 1881. The tree is very ornamental, and well suited in every way to the climate of California, or to those regions where the almond tree thrives. It is an exceedingly deep and rapid rooter, succeeding well in dry locations. On its own root it makes rather a low, spreading tree, although from a lot of young trees I have growing, from seed produced in Fresno County, they are by no means dwarf in character, properly selected. *Pistacia vera* belongs to the sumach order, and is distinctly dicecious, producing nuts on the pistillate trees only.

The future of the nut industry in California is very bright. To avoid

mistakes and disappointment, however, greater care should be exercised in the selection of soil and location, as well as of the varieties to be cultivated.

President JEFFREY resumed the chair.

THE CHAIRMAN. Mr. Isaac has a telegram which he will read.

The Secretary read the following telegram:

SAN FRANCISCO, CAL., December 6, 1907.

To President California Fruit-Growers' Association, Marysville, Cal.

The Japanese Association desire to place upon record their appreciation of the militant stand taken by your association in dealing with exclusion. They further express keen gratitude to the gallant Colonel John P. Irish, whose eloquent voice has been raised in the interests of justice and humanity.

FRANK YASSO MORI, Acting Secretary;
1612 Geary street.

MR. SPRAGUE. Mr. Chairman, I have a resolution which I wish to read.

Resolution Favoring the Development of Inland Waterways.

WHEREAS, Our present lines of transportation are already gorged with traffic, giving little hope that the great increase of traffic which is inevitable in the near future will be better provided for, except by promoting better inland navigation; and

WHEREAS, Vast areas of our most fertile lands are now covered with flood or yearly subject to such danger; and

WHEREAS, Such floods are largely increased by the progressive denudation of the mountain slopes of our waterways; therefore be it

Resolved, That we strenuously urge upon our members of Congress that they support the most practical plan for national action in support of the comprehensive plans of the National Waterways Commission, which propose that navigation, reclamation, forest preservation, and development of vast water power shall all be promoted by any plans which the nation shall undertake.

Resolved, That to this end we pledge our most earnest endeavor to secure the active support of these plans by the people of California.

On motion of Mr. Judd, duly seconded and carried, the rules were suspended and the resolution unanimously adopted.

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION—FOURTH DAY.

The Convention was called to order by Mr. KING, Chairman pro tem. Secretary ISAAC stated that President JEFFREY had been compelled, by the illness of his son, to leave for his home.

THE CHAIRMAN. I believe it is now within our province to go to the discussion of the resolutions.

The report of the Committee on the Governor's Address was read and, on motion of Mr. Mills, duly seconded, was adopted.

THE CHAIRMAN. The next order of business, I presume, will be on the communication from your Committee on Resolutions. What will you do with its report?

MR. JUDD. I move the resolutions be adopted.

The Secretary read the resolution favoring forest reserves, which was duly adopted.

The Secretary then read the resolution in favor of an exhibit at the Alaska-Yukon Pacific Exposition which, upon motion, was unanimously adopted.

The Secretary then read the resolutions of thanks to the Committee of Arrangements, the Ladies' Club, the Marysville press and Eben Boalt, which, upon motion, were unanimously adopted by the Convention.

The Secretary then read the following resolution, offered by Edward Berwick:

Resolution Favoring Parcels Post.

WHEREAS, This Thirty-third Convention of California Fruit-Growers, assembled at Marysville, California, this 5th day of December, 1907, realizes the great benefit that would inure not only to the producers but to all classes of citizens from the introduction of an up-to-date parcels post at such rates as are found feasible by other civilized countries; and

WHEREAS, The American express companies find it possible to profitably carry parcels up to eleven pounds weight, from New York to any point in the United States, for 24 cents for the British Postoffice; therefore be it

Resolved, That we call on our representatives in Congress to take such measures as shall permit the Postmaster-General to inaugurate such a system of parcels post as has been found in other lands an inestimable boon to all classes and an incalculable stimulus to trade; be it further

Resolved, That copies of these resolutions be sent by our Secretary to President Roosevelt, Postmaster-General Meyer, and to all United States Senators and Congressmen from the Pacific Coast.

The above resolution was, on motion, adopted by the Convention.

The Secretary then read the following resolution:

Resolution Thanking The Ladies of Marysville.

WHEREAS, The good ladies of Marysville, with much care and labor, provided a delightful entertainment for this Convention on the evening of December 3d, thus enabling the members of this Convention to meet each other socially, partake of dainty refreshments, and listen to rare music, and we feel we would be lacking in showing our appreciation for the fine courtesy shown us if we departed without some public acknowledgment of the same; therefore be it

Resolved, That this Convention tender the ladies of Marysville a rising vote of thanks for the courtesies shown us while sojourning among them.

The foregoing resolution was adopted unanimously by a rising vote.

The Secretary next read the resolutions: Asking for increase in the appropriation to the Horticultural Commissioner; Suggesting quarterly meetings; Requesting funds for the insectary; Establishment of national quarantine; Appointment of legislative committee to ask cer-

tain relief of the Legislature; In favor of extending State quarantine; which resolutions were all duly adopted.

The Secretary read the following resolution:

Resolution Opposing the Conversion of Hetch Hetchy Valley into a Reservoir.

WHEREAS, The citizens of San Francisco are appealing to the Federal Government to allow them to use the beautiful Hetch Hetchy Valley, in the Yosemite National Park, as a reservoir for the waters of the Tuolumne river, to be used by them as an addition to their domestic water system; and

WHEREAS, There are all too few of these gloriously beautiful mountain valleys accessible to the people; and

WHEREAS, These beautiful National Parks have enriched the lives of past generations, are enriching the lives of the present generation, and will enrich the lives of future generations; and

WHEREAS, There are many other sources of water supply that can be secured by the citizens of San Francisco without robbing the children of men of the profit and pleasure of these wonderfully and gloriously natural temples for worship by the sons of men, of Nature, and Nature's God to their everlasting good and welfare; now therefore be it

Resolved, That we, the Fruit-growers in Convention assembled, do most sincerely deplore the selfishness of our fellow citizens in San Francisco in thus attempting to destroy for commercial purposes this beauty spot of earth; and be it further

Resolved, That we most earnestly protest against this commercialization of this our heritage and the heritage of our children; and be it further

Resolved, That we demand that the Federal authorities shall forbid the use of Hetch Hetchy Valley by San Francisco for a domestic water system; and be it further

Resolved, That these resolutions be forwarded by the Secretary of this Convention to the President of the United States and to Secretary of the Interior Garfield.

After a spirited discussion, the above resolution was adopted by a vote of 24 in favor to 11 against.

MR. JUDD. Mr. Chairman, I have a resolution here that I wish to present at this time.

Resolution Indorsing the Officers of the Convention.

WHEREAS, The first convention under the new administration is about to close; and

WHEREAS, We fully appreciate the worthy and able efforts of President J. W. Jeffrey and Secretary John Isaac; therefore be it

Resolved, That we, the Fruit-growers in Convention assembled, express our hearty appreciation of their fair and able and impartial execution of our complex business; and be it further

Resolved, That we express our sympathy for our President in his family sickness that deprives us of his further attendance, and express a hope that an early recovery will gladden his fond heart.

On motion, duly seconded, the foregoing resolution was unanimously adopted.

MR. A. R. SPRAGUE then read the report of the Committee on Roads, as follows:

REPORT OF THE COMMITTEE ON ROADS.

To the State Horticultural Convention:

GENTLEMEN: Your committee to whom was referred the subject of good roads beg leave to report as follows:

The advance of human knowledge is made possible only because each generation of men records the results of its investigation for the use of succeeding ones. These in turn endeavor to determine what truth appears to be clearly established, and then proceed to push farther on into the unknown, leaving for their successors an increased store of ascertained facts and deductions. In this way only has been made possible the wonderful achievements of the present age in all lines of human knowledge.

Therefore, your committee conceives that it will be doing a service by classifying and summing up the very generally conceded truths regarding road-building up to the present time.

A rough classification of country roads may be made as follows:

- 1st. Main trunk lines of travel leading toward principal centers of population.
- 2d. Cross lines—connecting the main lines.
- 3d. Roads in sparsely settled valley districts.
- 4th. Mountain roads usually main lines.

In the interest of economy and of the efficiency of the whole system of public highways, the methods of construction should be proportioned to the amount of travel which the road is to sustain.

To illustrate: When a city begins to macadamize its streets, usually the travel into and out of town, and nearly all of the traffic of several streets on either side of its first macadamized street, concentrates upon the newly paved roadway, as upon H street in Sacramento, two years ago. Thus was thrust upon this road several times the traffic which it must carry after other parallel streets near by are improved. This caused a very rapid wear, especially in the middle of the street, so that when last season this was coated with oil, it was too flat to drain well, and while a perfect surface was maintained all summer and for a month after rains began, during the long-continued wet weather of last winter, and with very heavy traffic, the surface softened up, and now is again wearing badly, whereas a cross street, Ninth from H street north, treated in the same way a year earlier, has yet an absolutely perfect surface, having suffered no perceptible wear in those three years.

No country road in California, even in the most thickly settled district, is subject to such heavy traffic as is such a street of a city—even outside of the principal wholesale and retail section.

The general method of road building is the same for all roads. It is so universally conceded that it may be regarded as axiomatic.

- 1st. The roadbed should be well drained.
- 2d. During construction it should be thoroughly packed, the harder the better.
- 3d. It should be moderately rounded or crowned.
- 4th. It should be surfaced with some material which will leave every square yard like every other square yard—in wearing quality.

5th. The thickness of this surfacing material, when different from the material composing the substructure, should be proportioned to the travel which the road is expected to carry.

6th. When this surfacing material, placed upon a well-compacted, hard surface beneath it, has been well beaten together and thoroughly consolidated by travel, upon this hard surface should be spread a thin coating of oil, which should be given a week or two in which to penetrate the hard surface of the road, keeping travel off of it during this period by oiling but half of the roadway at a time, with sufficient barriers so placed as to make travel upon the freshly oiled surface quite impossible.

An alternative method for the application of oil is to place it upon the rounded, well-compacted surface of the substructure of the roadway and then apply sufficient fine gravel, macadam, or disintegrated granite, to form a hard, waterproof surface when well compacted by travel. One or the other of these methods may be chosen, according to local conditions.

To sum up: The roadway should be drained, packed, rounded, surfaced and water-proofed. Any roadway anywhere should be subjected to these five processes, if nature has not already rendered one or more of them unnecessary.

In a large portion of the Sacramento Valley, roadways are well drained by merely turnpiking them; often, too, the soil affords excellent road material; less often, however, is this material sufficiently homogeneous to do for surfacing, and the road, when made, always requires packing and waterproofing. If the roadbed is well packed while sufficiently moist, the surface will be hard and firm, so that unless there is very heavy travel upon it, two to three inches of crushed rock will give excellent satisfaction after becoming smooth and hard by travel and after it is properly oiled.

Except when a road must be made in clear sand, no oil should ever be placed upon a roadbed except upon a smooth, hard surface. Such a surface will not yield to the wheels of heavily loaded vehicles and hence will not increase the draught.

Most of the dissatisfaction caused by the use of oil upon roadbeds has been caused by disregarding this rule. Often the plaster formed at the surface of the road when oil is placed upon an inch or two of loose sand or dust, is so serious an obstruction to the wheels that not more than half the customary load can be hauled upon it. When using oil to make a roadbed in clear sand, it should be thoroughly mixed with it to a depth of five or six inches, in such proportions as will cause the mixture to become thoroughly hard and unyielding after a few weeks.

When clay can be added to sand, or sand to clay, the mixture will be found to pack well, giving excellent material for the main body of the road. Adobe must have sand or gravel or macadam before it can be made useful as a road material.

Gravel should always be screened before applying to the road surface—the coarser being put on first, after which the finer may be applied, as in the application of macadam or crushed rock.

Good material for mixing or surfacing may often be found in the subsoil of portions of the valley.

Above all, *experiment* with the material most available, constructing a few rods in each of several ways which give promise of good results, and following the general laws of roadmaking as above quoted. After a demonstration of just what method and material is needed for each particular class of road in each section, proceed to as extensive construction of permanent roadbeds as funds available will permit.

Several counties of the State have voted bonds sufficient to build good roads upon all main lines of travel. There is a great saving in such construction, as the interest on such bonds, together with an annual sinking fund sufficient to pay the bonds at maturity, will not exceed the annual expenditure in most counties simply for road repair—an expenditure which we all know is now almost wholly wasted from lack of sufficient money at one time to build permanent roadbeds, lack of a general plan pursued from year to year, and lack of a businesslike administration owing to the inadequate road laws of this State.

A. R. SPRAGUE,
NATHANIEL ELLERY,
W. H. AIKEN,
Committee.

MR. JUDD. I do not believe that there is in the State anybody who is more in favor of good roads than I am. It has cost me a great deal for good roads and I am still in favor thereof, but I am strongly in favor of an equal distribution of the expense of building those roads. As I told you in my paper, all of the good roads so far built in this State have been built by the farmer and the fruit-grower and the cities take no part in it; but, if you notice, they come up every time with resolutions for good roads. If they will amend their resolutions saying that they believe in amending the law to make equal taxation, I am heartily

in accord with it. The last Legislature passed an Act for the making and maintaining of boulevards. I had occasion to read that law in framing a resolution to our Board of Supervisors against voting bonds of \$600,000 to build a boulevard to the Big Trees. That law says that the boulevard shall be not less than one hundred feet wide; that no wagon shall go on it unless it has a four-inch tire; but there is nothing in the law to prevent a farmer from crossing the road if he wants to. And again, under no circumstances shall franchises ever be granted upon this boulevard for electric or telephone wires, electric lines or rails. The very inlet to the Pajaro Valley to-day is down the Pajaro River and the only place that a railroad can get in there reasonably. They select that particular place for a road one hundred feet wide. This law further says that when the road is completed satisfactorily and a commission appointed for the purpose, then it shall be turned over to the present road law for maintenance by repairs, and so forth. In other words, after they have got it built, or partially built, or the money runs out, the balance of it will be finished by the farmer as usual, and he will get no benefit out of it. It is class legislation and is one of the worst laws ever passed by the Legislature in this State. It is a burden to the farmer. Look out for it.

MR. SPRAGUE. Under the law, which is considered to be constitutional, under which Sacramento County voted \$600,000 of bonds for good roads, it is possible for every other county, I presume, to proceed in the same way. You have got to have a large sum of money. In Sacramento County the matter was referred to the people as to whether they should vote for these bonds, taxing the inhabitants of the city, and the vote in favor was much larger in the city than it was in the country, showing that the cities are ready to help in building good roads. We certainly need more and better road legislation, and I heartily agree with Mr. Judd in that respect.

MR. FILCHER. I may refer to a fact which I read in a Government report in the last day or two, that it costs, according to the figures of the United States Government, three quarters of a billion of dollars a year to carry the farmers' produce to market; and the United States Government experts estimate that two thirds of that money is chargeable to bad roads. If we can save half a million dollars a year, as a producing country we ought to build the road.

On motion of Mr. MILLS, duly seconded, the report of the Committee on roads was adopted.

THE CHAIRMAN. The next thing on the program is a paper on "The adaptability of Grapevines to Different Vineyard Soils," by Prof. George C. Husmann, Pomologist in charge of Viticultural Investigations for the U. S. Department of Agriculture. Mr. Husmann was unexpect-

edly called to Washington, and is therefore unable to be with us, as he had intended, but he has sent his paper, which the Secretary will now read to you.

THE ADAPTABILITY OF GRAPEVINES TO DIFFERENT VINEYARD SOILS.

BY GEORGE C. HUSMANN, OF WASHINGTON, D. C.

Phylloxera was introduced into California either from this country east of the Rocky Mountains, where it has existed on the wild vines for ages, or indirectly from Europe, or both. It appears to have been in California about as long as it is supposed to have been in France, although it was not located in the State previous to the year 1875. Preceding circumstances, however, indicate vines to have been affected with it as early if not earlier than 1860. It was first detected in France in 1863 and was most likely introduced on American vines imported for propagation purposes at the time the total destruction of French vines from oidium was feared, some ten or twelve years before the insect was discovered in the Valley of the Rhone. In 1869 it had gained a strong foothold in southeastern and southwestern France. There would be no special object in giving data relative to the time the insect was located in other European grape countries.

In 1882 the phylloxera was well established in Sonoma, Napa, Yolo, Solano, El Dorado, Placer, Sacramento, and San Joaquin counties, California. Records of the California vine disease were first published in 1885 to 1886, although some claim to have noticed effects of it in 1882.

Phylloxera and the vine disease have been the two principal agencies in the destruction of vineyards in California. To give some idea of the losses occasioned by them, I would state that in 1903 it was estimated in conservative figures that the loss of acreage of vines through them in California at that time amounted to at least \$1,000 per day. In southern California from twenty-five to thirty thousand acres of vines had been laid waste, while in northern California the entire vineyards of several of the leading grape-growing valleys had been destroyed, a number of the second plantings having also succumbed. In one valley where four years previously 6,000,000 gallons of wine were made, in 1903 the crop only amounted to 500,000 gallons.

Innumerable remedies have been suggested, and as many tried, with which to eradicate the phylloxera from vineyards, but no practical one has been found, and it has become an accepted fact that the only way to successfully combat the insect is to establish vineyards on resistant stocks.

The great diversity of soils and climatic conditions found in Cali-

fornia which make it possible to achieve such wonderful results in various lines of horticulture make the adjusting and proper selection of resistant stocks a complicated and difficult problem.

As far back as 1876 introductions and plantings of resistant vines were made by some of the more intelligent growers in the State, and some very good results were achieved on Riparia stock, because the soils and conditions where these plantings were made happened to be favorable. On account of these few good results, the Riparias as a stock were planted indiscriminately in high and low localities and on various soils. Unfortunately, in most instances the conditions were adverse to Riparias and failures predominated. Again, some thought the California was a resistant, and by 1883 at least 300,000 vines of it had been planted as grafting stock. Later on its resistance to phylloxera was ascertained to be very low. In the meantime, the Lenoir had given good results on some soils and all who could planted Lenoir, and more would have been planted had more cuttings or vines of it been available. Of late years just such a stampede has occurred to the Rupes-tris St. George, and similar mistakes are being made with it. These and other resistant stocks are good where conditions are suited to them, but are worthless where such is not the case. Had a systematic study of the wild-grape species and the soil and climatic conditions where they grow been applied in resistant stock plantings from the start, most of these disastrous results would have been prevented.

Resistance to the phylloxera or the ability of the vine to overcome the injury of the insect is influenced greatly by whether or not the vine is in soil, climatic and other conditions suited to it. A vine otherwise rated lower as resistant, under conditions congenial to it will often prove more resistant than one whose resistant qualities are rated higher but for which the conditions are not suited. Thus, the Lenoir, which in California on deep and loose soils has given excellent results and is the vine on which some base hopes of its resistance to the California vine disease, is not much thought of by the French as a resistant. The Concord, a Labrusca, the principal grape grown east of the Rocky Mountains, is only rated by French authorities as 5 in resistance out of a possible 20. Nevertheless, it thrives under conditions suited to it right where the phylloxera is at home. Instances like this, and the fact that in France much of the resistant work is as much directed toward resistance to calcareous conditions as to phylloxera, make it plain that resistant standards established by the French should not be accepted as infallible, but can perhaps only serve to indicate what might reasonably be expected here.

Were not other conditions involved to complicate matters, the simple determination of what resistant stock to use on any given soil need not of necessity be such a difficult problem. A study of the native species,

and of the soils and conditions in which they thrive best, should come very near telling us that. To illustrate: some of the principal characteristics of the native species of most value as resisters and direct producers are herewith given:

Vitis riparia is vigorous on moist soils only, and its varieties attain their best growth on sandy, fresh banks of rivers. They root easily from cuttings, graft well, and are very susceptible to drought.

Vitis rupestris is found in hilly, mountainous country, nearly always along gravelly banks and ravines where there is moisture all the year around but where water abounds only a portion of the time. Its varieties should never be planted where there is stagnant water. Their resistance to drought is good, they root easily from cuttings, bench graft readily, but are very difficult to handle as field grafts.

Vitis æstivalis varieties delight in high, warm, sandy and gravelly moist soils, and are rarely found in very dry soils and never in swampy lowland or lime soils. They are good growers, very fruitful, hard to root from cuttings, and graft well in vineyard.

Vitis linceumii is found in sandy, high, well-drained timber lands on ridges in siliceous or granitic gravel mixed with clay, rather compact soils, and also in very deep soils on river banks. It is very resistant to heat and drought, is a good grower, quite fruitful, but hard to root from cuttings.

Vitis bicolor varieties grow well on black sandy soils derived from old formations. Moderately good growers, fruitful, very resistant to heat, drought and cold, and hard to propagate from cuttings.

Vitis berlandieri is found in limestone hills, on top of and along the side of hills, on creek bottoms. Its varieties are of the most resistant to lime, drought, and phylloxera. They graft easily and are good graft bearers, but most varieties of them are exceedingly hard to root.

Vitis monticola is also found on limestone hills. Its varieties grow exclusively on low mountains or on tablelands—never in low places. They are resistant to heat and drought and graft well; exceedingly hard to root from cuttings.

Vitis cordifolia is found on soils similar to those in which the *Riparia* is found. Its varieties are vigorous growers and graft well, but are very hard to root from cuttings.

Vitis champini is found in the limestone hills of Texas. Its varieties adapt themselves to a variety of soils, stand heat, drought and lime conditions well, are good growers, root easily from cuttings and graft well in vineyard.

Vitis solonis is found in ravines, along banks of streams. Its varieties are of fair growth on sandy or lime soils and root easily.

Vitis doaniana varieties are moderate growers, do well on sandy or lime soils, root pretty easily from cuttings, stand heat and drought well, and graft well in vineyard.

Vitis cinerea is found in deep rich, loose soils, on river banks, and also quite often found in low swampy clay land, but is never found in very dry soils. Its varieties are hard to propagate and are of no special value except on swampy lands.

Vitis labrusca does best in fairly fertile, deep, fresh alluvial soils. Its varieties are moderate growers, very fruitful, root easily from cuttings, and graft well. By far the largest part of the varieties of our native grapes cultivated for their own fruit in this country are of this species.

Vitis vinifera, given because nearly all varieties of grapes grown for their fruit in California are of this species, loves a warm dry climate, but varieties of it thrive in nearly all well-drained soils. It is, however, not resistant to the phylloxera.

The resistance of none of the species to cold is given, because all of them resist more cold than is found in the viticultural areas of California.

The United States Department of Agriculture, finding that at least twenty years after the phylloxera had been well established in most of the leading grape districts on the Pacific Slope and that scientific and practical men had tried and spent large sums to counteract the devastations caused by it, and that these on account of the diverse soil, climatic and other conditions were as often, nay, oftener failures than successes, and realizing the gravity of the situation and that similar conditions were likely to arise at any time in any of the states and territories of this country where the growing of *Vinifera* grapes might become a commercial business and that a comprehensive investigation of the entire subject such as only the Department of Agriculture is competent to undertake was necessary, has for this purpose located eleven experimental vineyards, one at each of the following places: Colfax, Chico, Cucamonga, Fresno, Geyserville, Livermore, Lodi, Mountain View, Oakville, Sonoma, and Stockton. These were located with special reference to a diversity of soil and climatic conditions, nearness to and distance from ocean, bay or other bodies of water, in order to afford opportunity of testing and adjusting varieties and hybrids of the different species to varying conditions, the locations also taking in wine and brandy producing as well as table grape and raisin districts.

Of some of the many important problems receiving consideration in these experimental vineyards, the following are four of the cardinal questions under consideration:

1. To make a comprehensive test of the resistant vine varieties to determine their adaptability to the different vineyard soils and climatic conditions.
2. To study and determine the congeniality of *Vinifera* varieties to the different resistant stocks.

3. To ascertain which varieties are best adapted to the different localities and for the different purposes.

4. To afford opportunity for testing all classes of grapes with reference to their resistance to diseases which have been doing such serious injury to the vineyards, and if found necessary to undertake the creation of an entirely new class of grapes to resist them.

Your attention is here called to the fact that these experimental vineyards happen to be so located that there is not a grape-grower in the entire State farther than a day's journey from some one or more of them, and a cordial invitation is extended to all to visit them and profit by them individually. We are especially anxious to have you see them and tell us what you think of the investigations conducted in them and give us your ideas, suggestions, and criticisms. This will encourage us and spur us on to greater effort. Special pains have been taken to have the names conspicuously placed on each variety so as to enable any one visiting the vineyards to see and study the varieties, and we will also be happy to have you write to us for any additional information you desire.

In these vineyards over three hundred varieties of resistants and direct producers and over four hundred *Vinifera* varieties grafted on resistant stocks and growing on their own roots are to be found, and to this already large collection of varieties additional varieties are constantly being added. We have just completed over eight hundred acid and saccharine tests of *Vinifera* varieties fruiting on resistant stocks in the department experimental vineyards. These tests were largely made as a back check on our congeniality studies, and are bringing out a great many interesting facts. They indicate, for instance, that the same *Vinifera* varieties grafted on different resistant stocks may be much sweeter on one, may have relatively more acid on another, ripen earlier on some than on others, be more productive on one stock than on others, etc.; in fact, often are entire successes on one variety and failures on another. They show the important fact that in order to successfully establish a vineyard on resistant stocks, while it is imperative that stocks be selected that are suited to soil and climatic conditions, it is not less important that stocks be selected also with reference to their congeniality to the varieties it is desired to graft on them. They indicate the important fact that some of the commercially well-known varieties which are now being so largely planted for diverse purposes, although they are on resistant stocks, are likely not to prove successful, because the stocks they are on are not congenial to them, even though such stocks may be well suited to the soil conditions into which they are to be placed. Therefore, there are at least three questions that every intelligent grape-grower should ask himself and have answered before planting:

1. What *Vinifera* variety or varieties he desires to grow and whether they are suited to the environments in which they are to be grown.
2. The stock best suited to the soil and location.
3. Whether his *Vinifera* variety or varieties and the resistant stock in question are congenial.

It should, of course, also be determined beforehand whether bench grafts are to be used or whether it is intended to nursery or field graft, the suitability of stocks in this respect varying decidedly. Such points as these it takes years to solve and the individual grower can not afford to solve them. This should, however, be all the more reason for the growers to keep in close touch with what is being done for them in the experimental vineyards. The lack of doing so may mean to them only partial success or even failures when successes can be just as well and cheaply had.

I desire also to mention that some of the direct producers, especially red varieties, have so far given us some very good results. Conclusions should, however, not be too hastily reached, as it frequently happens that varieties do well for a few years and then decline. The real resistance of many of them to phylloxera is still undetermined.

In order that the investigations carried on in the experimental vineyards may have as direct application as possible to the vineyard soils, analyses and maps of the soils have been made and correlated by the Bureau of Soils.

A few words of caution are not out of place relative to the enormous vine plantings that have the last few years been made and that will be made the coming season. These have resulted largely on account of the shortness in the wine supplies on hand that were occasioned by the San Francisco disaster, where at least 15,000,000 gallons of wine were lost, and the heavy demand and increased shipments of table grapes from California the last few years occasioned by the shortness of the Eastern grape crop and other deciduous fruit crops. Of these plantings a majority are not on resistant stocks, and not enough consideration is given to the selection of varieties with reference to their fitness for the purpose grown or the surroundings in which they are planted. While the lack of information that has heretofore been on the adaptability of resistant stocks is some excuse for the planting of non-resistant vines in soils where the insect is naturally restricted in its progress, and this is especially true in districts where the phylloxera has not yet been located, there is absolutely no excuse for again planting *Viniferas* direct on land where the vineyards have been previously destroyed by the insect or where it is known to exist.

THE CHAIRMAN. We will now proceed to the subject of "Grapes," by Mrs. M. E. Sherman. I believe her paper is here, if Mrs. Sherman is not.

DR. SHERMAN. There is a little error in the subject. It should have been "Muscatel Grapes" instead of "Grapes."

MUSCATEL GRAPES.

By MRS. M. E. SHERMAN, OF FRESNO.

The earliest of historical people had raisins, dates, and figs for food. Man's inventive genius was not taxed by having to cure these fruits, for in a dry, warm climate they dried on the vines and trees. The simplicity of the foods of the ancients suggests the Garden of Eden, where food was the product of plant life, secured to man without toil.

In California, twenty years ago we had nearly perfect conditions. Then there were no codling moth, no phylloxera, no pear blight, no white fly, and no petty thieves. The rich people kindly took themselves off to New York or Paris for their foolish display. We lived the simple life, for none were over rich and none in dire poverty. Child-like we babbled of our blessedness. Then came codling moth and pear blight. One-lungers and remittance men followed, then tourists and Paris fashions. These things we have assimilated. All the undesirable races of humanity have found a resting place in our earthly Paradise, and when we dare to object the whole United States is shocked at a lot of talk, until it fears a further attack of gastritis, and we are silenced.

The workers for social betterment are appalled at the increased number of men who, with opportunity to earn money, refuse to work. They loaf, living on the earnings of their wives, and (thank God, we have no longer to add) "of their children." These helpless ones are released, by the strong hand of law, from the weary hours that make a day's work in the canneries and packing-houses.

The first raisins made in the United States came from California. To whom the credit is due I do not know. I am not here to throw that apple of discord into our midst. They were made (and that is enough) in the seventies, and along in the eighties became a commercial success. The peculiar suitability of Fresno soil, the abundant water supply, the long drying season, free from dew and fog, soon singled out Fresno County as the raisin center of the State.

The details of planting and laying out of a vineyard will be passed over, as time is limited. The choice soil for raisin grape culture is of small area, even in Fresno County's vast domain. The deltas of the many wet-weather streams that rush down from the Sierras and sink away into nothingness on the sandy plain carry the rich fine red soil to make raisin land. This heavier soil is a little later, about ten days, in maturing the grapes, but it makes the rich meaty raisin, one that is a mass of tender jelly inclosed in a thin skin.

On the heavy red soils the vines reach maturity earlier and make larger vines than on less favored soils. The often told story of paying crops of raisins on three-year-old vineyards is true of this soil. I have had three fourths of a ton of raisins to the acre on a three-year-old vineyard. To secure this result the curing and cultivating seasons must be ideal in their way. The vines as ordinarily planted are picked up at random, often made from cuttings taken from a brush pile. This is not the way to make a first-class vineyard. A vineyard is well made when the cuttings are first selected from market vines, then rooted, and again, only the best of these rootings are planted. There is no royal road to vineyard making more than to any other kind of goodness; it is ever the narrow, straight path of doing each day's work well.

The varieties of grapes used for raisin making are of European origin. The Muscat de Gordo Blanco, the Muscatelle of Alexandria—both names are used for a white grape in Fresno County that is too nearly alike to have different names. It is a large, light yellow-green grape, with a distinct flavor, thin skinned and very sweet; a good table grape, as the berries are large sized. It has a fair number of seeds that are closely held in the pulp. The Sultana and the Sultanina are small, light yellow-green grapes, that grow in large bunches and are entirely seedless. A few Feher Zagos and Malagas are dried each year, also for raisins. Under proper conditions the Muscat is a vigorous grower, but it has little ability to withstand adverse conditions. When it is starved it takes to making small two-crown and seedless berries. When this occurs it is time to lengthen the pruning and to put on some fertilizer. The Muscat has been pruned short, very short, to force it into producing crown clusters of large berries. The demand for the Dehesa cluster has grown less each year. Fresh fruit is plentiful all winter in the large cities and raisins are no longer a necessary part of the dessert. To-day, quantity rather than quality is in demand in raisins; the pruning has been lengthened; three, four, and five buds are left on the spurs where a few years ago two would have been considered as enough.

The Muscat is pruned to low stumps. It was strongly brought to me how forlorn they look after pruning time by a woman on the train saying to me, "I thought this country had grapevines." I said, "Yes, there is a vineyard." "Oh," she replied, "I thought that was newly cleared land covered with stumps." Certainly it requires an eye of faith to see those stumps in a few short months become a vineyard full of beauty. Nature, however, even in the winter time, paints the red brown soil and surrounds the blackened stumps with the gorgeousness of the poppies, and they fill everything with the sunshine of their fragile beauty.

Frost and defective pruning produce "nigger heads" in a Muscat vineyard. These round black masses with a fringe of new canes around

their bases are indications of a failing vineyard. The remedy now applied is to raise as many of these canes as possible to the crown of the vine, tie them together and cut them across to make a new crown over the old one. As soon as these spurs are stiff enough to be self-supporting the cord is removed. The next year's pruning uses these spurs as old wood and cuts to leave two or three buds on each cane coming from them. Old vineyards that had dropped in production until unprofitable, after three years of long pruning have come into full bearing again. What the ultimate result will be we can not foresee, but it is certain that old blasé vines have been restored to youthful verdancy.

Spring frosts are one of the troubles that make the morning naps of the raisin-grower far from peaceful. These are mean nips that kill back the early leaf and take the tiny, new-born bunches. The baby bunches of grapes are folded away with the tiny leaves and tendrils in the bud by the mother vine for next year's unfolding.

While it is known that the crop is often greatly shortened by this nipping, little has been done to prevent its ravages. It does not come often enough to be a serious menace, fortunately. We have tried brush burning, fire pots, and all the rest of that smoke-forming cloud-protection. It was lots of fun for the boys to get up at three o'clock in the morning, have hot coffee out in the vineyard, and then have half a day off to sleep. However, the smoke would never obligingly form a cloud, but sailed straight up and up and up out of sight.

Water on the land will lessen frost in a large way; consequently, the skilled vineyardist now tries to have the small irrigation ditches full of water. It is also a matter of observation that during the heaviest spring frost we ever had the coldness flowed like water, so that a fence or a row of trees turned aside the flow and in many cases that portion of a vineyard was saved. These hours of coldness come at about three o'clock in the morning and pass with sunrise, so that it is only for a few hours at most that the vineyard needs guarding against frost.

The vineyard in the springtime rapidly takes on beauty. The tiny green woolly leaves put out on the brown, lifeless-looking trunk and touch the heart with their tender, baby-like helplessness. Quickly they grow, and soon the leaves take on a shining surface, like the school boy's happy face. Then comes youth and the outreach of the clinging tendrils of love outreaching until they clasp hands across the rows with another outstretched hand. Middle life is the long hot summer days, the period of fruitage and of silent work; and autumn, like old age, has the perfect grapes, the wine of character tried is ready for the gathering. The leaves as earthly gross silently fall one by one, returning back to earth. The vintage is here and the vine sinks into the silent sleep, awaiting the resurrection of spring.

Good plowing and plenty of it, varying the depth year by year so that the plow sole is controlled. Then cultivating to retain the moisture. The old story of increasing fruitfulness of the vineyard in which the old father told his sons he had buried a treasure is applicable to California. The land needs working. Try it this season for yourself. Water a ten-acre piece of vineyard, then divide it into four equal parts; plow the first quarter as usual, then give the next quarter one extra plowing, the third quarter two extra plowings, and the fourth quarter three extra plowings; double the cultivating and harrowing in the same proportion. The result will show not only the first year, but will continue to show for a term of years.

The chief defect in the Muscat grape is weak pollenization, or dropping of the berries at blossoming. It is a good plan to plant the long way of the vineyard every other check with a good vine for pollen. The wine grapes have many varieties that are useful for the purpose; if it is cared to grow wine grapes extensively, then a row every ten or twelve rows will answer very well.

The Sultana and the Sultanina are trellis vines and add to the expense of handling. The sale of these seedless varieties of raisins is somewhat hurt by the seeded Muscat, as a commercial product. The tendency this year was to ship them green, and they are desirable and profitable for that purpose.

As the years pass we are more and more confirmed in the opinion that all vineyards are cleaner and healthier that are sprayed with Bordeaux mixture every winter; a spray 4-4-40 in strength we find necessary to raise clean table grapes. On the Muscat the rough "nigger heads" are full of fungous growths.

Careful sulphuring of the Muscat is important. The first sulphuring is done when the buds first swell and open, the next at blossoming time, and a third when the vines need it. In a warm year the vines rarely require the third sulphuring, while a cloudy spell will quickly develop mildew in a dirty vineyard. The sulphuring machine makes this work much easier and reduces the expense over one half when compared to the old way of sprinkling from a can.

The worst pests we have had in the last few years are thrips and hoppers. These are thick at night, or rather at dusk. In driving alongside of a vineyard they blind the eyes of the horses and drivers. In the vineyard they cause early loss of foliage, leaving the grapes to sunburn.

A raisin vineyard represents a heavy investment nowadays, for sweat-boxes and trays eat into money very fast. The trays are of wood two by three feet in size; across the end are two-inch cleats. These cleats are made higher than the trays, to permit stacking and turning.

The weather agent earns his pay in Fresno if he answers the tele-

phone in September and October, for whenever a cloud no bigger than a man's hand appears every grower expects a terrible storm. When the message does come, "Stack your raisins," the big bell rings, every man on the ranch leaves his work and all hands pile up the trays. If it does not rain, some are ungrateful enough to growl. If it does rain, the raisins are stacked and the grower goes to bed to listen to the patter and pour of the rain. Perhaps all the next day it continues and he frets over the prospect of heavy dews after the first rain. This is one of the pangs of growing raisins.

The life of a raisin tray is about nine years. After the third year the repairs increase until the tray is like the boy's jackknife, first new blades, then a new handle, until all the original tray has gone glimmering. The need to-day is for some substitute for wood for trays and sweat-boxes as well as for the packing-boxes.

The ripening of grapes is shown by the dulling of the bright green foliage and when the juice of the grapes tests twenty-four per cent. Then the trays are hauled out and the flurry of picking begins. It is not long before the trays stretch along the rows full of the light yellow-green grapes. The air is full of the soft, sweetish, acrid smell of the drying grapes. After ten or twelve days of exposure to the sun the half-dried raisins are turned. This is quickly done by putting an empty tray on a full one and reversing them, leaving the raisins other side up exposed to the sun. After a week they are stacked and allowed to finish in the shade. This makes a more meaty raisin than if they are permitted to finish entirely in the sun.

In former years the size of the bunches and berries counted as extra money; then the picking was carefully watched and paid for by the day. Now that all this has passed, the work is contracted. This year the price was \$15 a ton, delivered in the sweat-box. This is the highest price we have ever paid.

The quality of the raisins has fallen steadily of late years. The first and second settings or crops are picked together, and many of the raisins are deficient enough in sugar to be merely dried grapes.

Raisins are not handsome in coloring and require more skill in adding color to them by means of ribbons and fancy paper than any other class of fruit. The ordinary package of commerce is not only expensive, but it is a hideous, unappetizing-looking affair. At present crude colors seem to prevail, with gold trimmings. No one desires to eat gold or silver.

The packing of the raisin grape has become centered in the towns. The home packer is down and out in nearly every case. The cause has been railroads and the large seeders. The royalties on raisins seeded had to be paid and it has cut greatly into the profits of the raisin industry, for seeders and railroads charge all the traffic will bear.

The packers in dealing with the growers have always shown a surprising lack of tact. One man among them, who will always do right, when appealed to personally has been nicknamed in derision. Moral honesty, the honesty advocated by Mr. Roosevelt, the honesty that is honest because it is right, has been largely lost sight of and mere honesty that serves to keep a man out of jail has taken its place. The brotherhood of mankind has been forgotten by grower and packer alike; it has become a game of who can beat the other.

The present conditions are shown in the reluctance of the older settlers to plant Muscat vineyards. The wine men are trying to discourage the further planting of wine grapes. They certainly have stopped it for some time by the policy of this year's settlements. When money was scarcest and things looked darkest, the Wine Association paid the growers in notes, at a low rate of interest, not due for six months. This was the loyalty they have shown in helping the credit of the people.

Phylloxera and pear blight are still in our midst. The vine disease has not reached Fresno. The vine disease would be, like pear blight, a wipe out. It would not pay to fight it. So far our vineyardists can, like the good Indian, say, "Thank God that others are worse off."

In fighting phylloxera we have the experience of Europe in growing resistant roots. In Fresno it does not do to talk phylloxera. On one vineyard, where vines were being removed as worthless, I said something about phylloxera, but the foreman was indignant and said, "Why, it is only nematodes on the roots." I smiled, for all my neighbors know so much more than I do that it is useless to say much.

The right root on which to graft the Muscat has not as yet been definitely settled. In South Africa the Rupestris Metallica has given good results. The Rupestris St. George, that we all rushed for at first, is at present rather under a cloud, as it has not proven altogether satisfactory as a root for Muscat. The present root that seems most promising is 1202 M (Morvedre Rupestris) of Franco-American stock. This root has proven vigorous and seems to like Fresno conditions of a rising and falling water table.

After all, the grape industry in California is new, when compared with the old world. New industries must find their places in the world's economy. The new industry brings with it changed conditions in the world's markets. Time will balance some of the evils of bugs and bacteria. Fruit packing-houses that live on the growers' money and hand out "red ink" are of a necessity self-limiting. They are like the bacteria that die from their own poisoning.

Let us not lose, in the present times of depression, the upward looking toward better things. By our reaching out to help the small portion of the world around us back to the old-time industry and honesty, when labor had its own perfect reward in its honest pride of achieve-

ment, and when grafter did not seize the money of the people; let us laugh and rejoice that we live in a land of sunshine and flowers, that California is our home and our earthly Paradise.

MR. BOOTH. Mr. Chairman, in that paper there is one item to which I would like to call your attention. Mrs. Sherman states that she does not know who made the first raisins in California. They were made by B. N. Bugby of Sacramento. His orchard was a little above Nigger Hill, in El Dorado County. They were made in 1868. Shortly after that, R. B. Blowers of Yolo County began to make them out of the Muscat grape, and I believe the first quantity of grapes that Mr. Blowers had was in 1870, and from that sprang this whole business of raisin-making.

MR. SPRAGUE. I would like to ask what appears to be the advantage of leaving the canes so long the first year and then cutting them down to two or three buds the next?

DR. SHERMAN. It seems to be the experience there, that when they have pruned their vines so short they have sacrificed so much of the wood that they have reduced its vitality and it produces neither the grapes nor the wood that it should produce, but by leaving the crown higher they get more grapes. The Emperor grapes suffer in the same way. The old Emperor vineyards in Fresno County to-day are suffering from something of that kind.

MR. FILCHER. How many canes do you use generally?

DR. SHERMAN. That is a matter of judgment. We leave as much wood as we think the vine will develop, according to its vigor. In this new method of pruning we leave about four buds. It is all a matter of judgment as to what the vine will stand. If it is in a heavy soil we leave more than if in a light soil, and if the vine is vigorous we give it all the wood we think it will stand. The vineyardists have been pruning heretofore for big clusters and big grapes, and the Japanese and all the others who make a business of pruning have learned this way of pruning and they whack it off to make as much speed as possible.

MR. ISIDOR JACOBS, who was on the program for a paper on "Relations Between Fruit-Grower and Canner," was prevented from attending, but forwarded his paper, which is given below.

RELATIONS BETWEEN FRUIT-GROWER AND CANNER.

BY ISIDOR JACOBS, OF SAN FRANCISCO.

There can be no doubt that these relations should, and must necessarily be, pleasant and mutual where both are agreed to do the right thing by each other. It must be recognized that the fruit-canning business of California only uses a small proportion of the fruit crop,

variously estimated from six to twenty-five per cent of the production, according to different varieties. It is, therefore, evident that the prices the canner should pay for fruit are largely dependent upon conditions outside the canning business. First, upon the dried fruit demand, and the facilities for drying. Second, upon the demand for fresh fruit in the East; and the facilities for handling it.

It is certainly self-evident that a fruit-grower should not be a speculator; but when he can make a contract for one year, or a period of years, with a canner in whom he has implicit confidence, at a price that will pay him a good estimated profit on his estimated crops, it is to his interest to make such a contract. It is a fact that the fruit-canner is willing to pay to the grower, a good, fair price for fruit, but he requires first-class fruit to be delivered in accordance with the contract. Although it is frequently the idea that when the market goes down, or there is a glut and the canner can not handle the fruit, he is more inclined to reject it, yet this occurs very seldom. It is, of course, human nature that when such a state of affairs occurs the canner will be more critical in the examination of the fruit than he would ordinarily, and when he is faced by a tremendous loss because he can not handle the fruit he has contracted for, he is certainly going to endeavor to get out of the contract if the fruit does not comply with the same; whereas, on the other hand, when the market goes up, and the canner can handle the fruit, he is inclined to frequently overlook the conditions existing, and accept the fruit even if it does not comply with the contract. Yet, after all, when we consider the amount of fruit handled by the fruit-canners of this State, there is comparatively small reason on the part of the grower to complain, for if the fruit-canner is honest and intends to do the right thing and live up to his contract, and if the fruit-grower is honest and intends to do the right thing and live up to his contract, there certainly should not be any reason for complaint on either side. It is in every way a question of right-doing, and dependent entirely upon the good faith of both parties to the transaction.

One thing is certain, whether the fruit is for canning purposes, or for drying, or for shipment East, it is to the advantage of the fruit-grower to use his best efforts to produce a good grade by properly thinning the fruit on his trees, and exercising careful and good judgment.

The relations of fruit-grower and canner, therefore, it may be stated in conclusion, depend entirely upon good faith and honesty on the part of both.

MR. JUDD here presented the following resolution:

Resolution in Favor of Good Roads.

WHEREAS, There is a greatly increased demand for good roads in California, owing to the constantly increasing traffic and increasing demands upon them; and

WHEREAS, The wealth and population of California are fast being concentrated in the cities and towns; and

WHEREAS, The road law of 1883 exempted said cities and towns from road districts, thereby putting the whole burden of road construction and maintenance upon the farmer and fruit-grower; therefore be it

Resolved, That we, the Fruit-growers of California, in Convention assembled, respectfully ask the incoming Legislature to amend said laws so as to equalize the burdens of taxation for road purposes fairly between country and cities.

MR. JUDD. I move the suspension of the rules and that this resolution be put upon its passage.

The motion was duly seconded and carried.

MR. S. C. MASON, of the U. S. Department of Agriculture, was requested to speak of date palm culture.

DATE GROWING IN CALIFORNIA.

By S. C. MASON, OF WASHINGTON, D. C.

Ladies and Gentlemen of the Convention: I have been an interested listener to your discussions and papers here and had not expected to take any part in this meeting. I will be glad, however, to say a few words regarding the date industry, which is something that is comparatively new to California and the southwest. Of course, date trees have been grown—are grown in the region north of Los Angeles, but probably very few fruiting successfully.

The date, as it is expressed by the Arab, is the "queen of fruits." It must grow with its roots in abundant water and its head in the glowing skies. We have the glowing skies in the southern part of the State and we have the abundant heat. Briefly, dates require a very long growing season of extreme heat and extreme dryness of the atmosphere and lack of rainfall, especially lack of rainfall during the ripening season, in the months of September, October, and November. I think the first introduction, in a systematic way, of date varieties from the regions of Africa was made about 1888 or 1889 by the U. S. Department of Agriculture. There are a few surviving trees of those importations, the only one that I know of personally being a tree growing near Indio, an offshoot that was given by the Department of Agriculture to General Towne and by him transferred to a homesteader named Patrick Kelly, who planted it when Indio was simply a wood siding. This tree, then, is something like eighteen or twenty years old. I had the pleasure of pollenating that tree last spring. It stands, perhaps, as high as that gallery. Perhaps I ought to say that the date has the fruiting flowers on one tree, the male or pollen-bearing flowers on another. This is true almost without exception, although we found near Tempe a very curious condition, male and female flowers on the same tree, like on the corn stalk; but these are very rare cases, so far as we know. In systematic date culture about fifty of the female or bearing trees are

planted along with one of the males. The male flowers are cut from their sides as they emerge, carried to the female trees, and a very fine pollen dusted over the female flowers. If, for any reason, the crop of pollen should be destroyed in a given year, the date-growers realize that they would lose their crops; so they make a practice of drying these pollenating flowers, wrapping them in some tight material and hanging them up until the next season. It is a very interesting fact that the pollen will keep its vitality until the next year. I pollenated these trees from flowers that were born in the little park next to the Indio Hotel, took the pollen out three times, and it set fourteen magnificent clusters of fruit. At the time I left the hotel in the latter part of July I think there were fully four hundred pounds of green dates—perhaps they would have weighed more than that—on the tree. They didn't allow those dates to ripen properly, for I have been told that the partly ripened dates were carried away by the pocketfuls.

The most extensive date plantation is at Tempe, Arizona, where the U. S. Department of Agriculture furnished the offshoots. It now contains six hundred trees, including something like two hundred of the choicest grown in the north of Africa and the Persian Gulf district.

The ground is furnished and the work carried on by the Arizona Experiment Station, and the results as to fruit, usually shared by the Department of Agriculture and the state. I spent two weeks in the study of this recently. The conditions for successful date-growing are rather reversed this year. Instead of having the dry, hot weather all autumn, there were two and a half inches of rainfall in the month of October at Tempe, cool nights, heavy dews, and plenty of water in the river, so that irrigation began on the ranches and the water came up to within thirty-one inches of the surface. The date garden was filled with a blanket of almost saturated air during the nighttime, moisture emanated from the soil during the day and the dates began to rot, so that only the earlier varieties were successfully cured. We are hoping that some of the very choicest of the later ripening bunches may still be cured, as they have had much better weather in the latter part of November and into December.

The very queen of all the dates so far brought into this country is the Deglet Nuer, meaning the "date of light." Of all the varieties that we have studied thus far, this is the date that requires the highest number of heat units for its perfection. It is considered that the minimum temperature for date-growing is about 64.4 degrees—that is, of mean temperature of the day—so that all the heat units above that during the growing season, from May to October, may be placed to the credit of the date. If something like 3,000 or 4,000 units are accumulated during that time, that is, if we have about a mean of 70 degrees as is maintained in the Fresno country where the raisins are perfected

we believe that the earlier, quicker ripening dates may be grown. If the number of heat units runs up to 5,000 or so quite a large number of varieties will be perfected; but only in a reading of 6,000 or 7,000 units above the zero point can the very finest of Sahara dates be produced. Those conditions exist in the Coahuila and Imperial deserts of southern California, in the Pala Verde country and around Yuma, and to a limited extent in the lower Gila country. Throughout the lower Salt River and Gila River countries about Maricopa, Phoenix and Tempe, and perhaps up into the Pala Verde country, the medium quality dates could be grown to perfection in most years. There are already some fine old seedling date trees in the neighborhood of Phoenix. One interesting case is that of Mrs. Lount there, who says: "The first dates that grew on the ranch, my husband brought me the seeds in his vest pocket. He had been to town and eaten the dates and when he came home he gave me the seeds." She planted the seeds and quite a number of trees grew, and contrary to the usual rule, which is that the trees will come about half and half female, the majority of her trees proved to be male, but out of that number she secured one very fine sort, indeed, and others of fair quality and they are growing today in her yard in Phoenix. She said to me that the best date ever grown in Arizona was planted by a Mexican, and when that place was leased by a family and they began taking offshoots from that tree she wanted one and they would not give it to her. She says: "One night, when I knew they would all be away, I took my Mexican man, a lantern, and an irrigation shovel and went over there and stole one and brought it home and planted it. And it was a good thing I did, because they tried afterwards to move the old tree and it died, and the offshoots died, and that is all I have to represent that splendid variety. I have one old tree and six offshoots from it."

Now, this illustrates the way in which the date tree is propagated. In California it is an easy matter to take off a slip and graft it or root it; any single bud of these varieties of exogenous fruits is good; but in the case of the date there is only one bud, and that is at the top of the tree.

The date trunk makes no initial expansion in diameter except through the first month, because it has no growing, living layer, but the living cells are all through the trunk, so we depend on offshoots, and after fifteen or twenty years the date tree ceases to bear these offshoots. There are to-day very choice varieties of dates growing in the Gulf region and Florida from which we have no means of getting any more trees because they have passed the offshoot-bearing stage.

At the present time we are distributing a large quantity of date seeds of the choicest varieties to the settlers in that district which I have named, with the idea that from these seedlings may be secured, by

careful selection, varieties better adapted even to California and Arizona conditions, and even in southern Texas, than all but a very few of the imported varieties would give us.

Last Tuesday I addressed a farmers' institute under the auspices of the California Experiment Station, conducted by Professor Neff—a gathering of people who were very enthusiastic on matters pertaining to the Coahuila Valley. We distributed about eight thousand seedlings last spring and great quantities of date seeds, so that in the near future we may hope to add to the wonderful resources of California this further industry of date-producing—in this country that is so hot and so dry that it bids fair to give success to this work.

MR. JUDD. We have with us other professors, and I would like to hear from Professor Stubenrauch and Professor Mackie.

PROFESSOR MACKIE. Mr. Chairman, and Ladies and Gentlemen: I have scarcely prepared anything for this meeting except a very receptive ear, which has been filled with very many good things. In regard to my own work, it follows very closely that which was outlined in the excellent paper read by Mr. Mills last evening, and a great deal of it would simply be a repetition of what Mr. Mills has placed before us. There is, perhaps, just one little matter which I wish to add to what Mr. Mills said, and which interested me personally a great deal, and that is in regard to the addition of humus to the soil in California. It is my province to classify the soils of California, get them into various groups and certain correlations, and in regard to the humus of the soil, the State is divided into two or three groups. The soils of the southern portion of the State, as Mr. Mills has told you, are deficient in humus. There are certain soils throughout the San Joaquin Valley also in that class. The Sacramento Valley soils have very little sand in them; sandy loam is about the lightest soil we have, except where the rivers wash. In the Sacramento Valley the humus problem is not quite so great as it is in the southern portion of the State. The main problem in all these places is to get a certain amount of humus to carry food to the plants, and two ways are provided of supplying nitrogen to the plants. One, as we all know, is by the cover-crop method, or getting it into the soil by means of the bacteria on legumes. The other is by another set of bacteria which also live in the soil and produce nitrates by direct oxygenation of the hydrogen in the air. These can exist only where humus is found in the soil in a healthy state; that is, free from improper substances which will destroy the action of the bacteria. It may be said that the nitrates of the soil exist only where humus exists. That means that wherever we can extend the humus in the soil we can extend these two sorts of bacteria which form nitrates; and the growing

of a cover-crop and plowing down, with the addition of barnyard manure, have been found to be the most efficient means of adding nitrogen to the soil; and I believe that the addition of the cover-crop, whether it is planted or whether it is the ordinary vegetation which comes in the soil, will produce humus, which helps especially this latter bacteria. This is just a little interesting item that I thought I would add to Mr. Mills's excellent address. (Applause.)

MR. JUDD. We would like to hear from Professor Stubenrauch.

PROFESSOR STUBENRAUCH. Mr. Chairman, Ladies and Gentlemen: I did not intend to have much to say at the Convention, because the work which I am doing is hardly ready to give out. I dislike to get up and say what I am going to do. I would rather wait until I have done something and then give you results. This morning you heard from Mr. Reed something of the work of the U. S. Department of Agriculture in southern California dealing with the investigation of the causes of decay in citrus fruits. I had the honor to be connected with that work and that is part of my duty in the winter. I am, however, taking up the interesting line of investigation dealing with the cold storage of California fruits. We attempted to keep some of the deciduous fruits in cold storage last year and also this past season, dealing with the peach and the plum and the pear. Going on further, also studying the behavior of our apples, particularly those from Watsonville and the Oak Glen country, and also the study of the storage of different varieties of California grapes, the idea being in this last investigation to see if we can not get for the California table grape the trade and market which now go to the Almeria. I had occasion to look into this matter when I was in Washington and found that about a million and a half dollars are spent annually for Almerian grapes, and it has been my dream or my hope to find some way of prolonging the market season of our own excellent table grapes so that we might get at least a portion of this mighty trade. This work is in progress now. In a small way we began last season, using about fifteen varieties, selected from the San Joaquin Valley, from the Tulare station conducted by the University, and packed them in different ways. This was merely a preliminary investigation to find out, if we could, the style of package, to see how the grapes should be handled and packed to keep in storage. We tried different packing materials, including cork dust. The Almeria grapes all come in cork dust. We were trying to find some material that could be used as a substitute for this cork dust. We also experimented with storing in the ordinary open crate. Our investigations last year showed that we could not keep the grapes as long in the open crate as when using some material in which to pack them. Cork dust was the best thing we had last year. Next to that we tried wheat bran, which did very well as far as it went, but after a time in storage

it seemed that the bran absorbed moisture from the fruit and caked, becoming so hard that it was difficult to get the berries out. Then we had a lot of grapes, each bunch of which was wrapped in paper, as deciduous fruits are wrapped. I would discard all of these materials except the cork dust, though this year we are going along with these investigations and using other materials as well as cork dust. We tried to find some substitute for the cork dust because it seems impossible to get it in sufficient quantity in California. We might have to grow our own cork, and that would not be so ridiculous as it seemed at first. We can use the outside of the bark and it would not be necessary to have very old cork oaks. However, I am on the track of some other materials. I won't mention them here because some of you may smile, but I am on the track of some other things which I think might be successful, and we hope to be able to tell you something about this at another time.

But the foundation of all is careful handling, just as we found in the case of the orange—carefulness in the packing and in all the handling of the fruit. I had occasion to get some grapes from a district, and found by actual count that from twenty-five to forty per cent of the berries had been injured in packing and the fruit would not keep.

You heard something said yesterday about the superiority of the California grape and the demand for the California grape if in as good condition as the Almeria. I think we have a problem there just as we have in the orange work. By studying the methods by which the grapes could be more carefully handled, and perhaps using some different method of packing these tender varieties, we could attain the end. These are some of the lessons which have been learned from the work thus far. It is wholly incomplete and I do not present it to you as conclusive in any way—simply to give you an idea of some of the work which is being done in our line of investigation.

One thing I might mention, and that is this: that with careful handling, the tenderest Muscat grapes and some of the varieties like that were kept in excellent condition last year from four to six weeks, even in open crates. I think that is very hopeful. It shows to what extent the life of the fruit can be extended if we use care in putting it up. I do not like to say much about the deciduous fruit work, the storage work, because I do not think that is going to be as important as the other. We have been able to keep peaches and plums from four to six weeks in storage. That extends the market for those fruits just that much. After that we can keep them perfect in appearance, but the taste and flavor seem to be gone. And another thing, the ripe fruit keeps the best; we can keep the ripe fruit longest and keep it in better condition.

Now, this is rather a rambling talk and gives no idea of the amount

of the work we are doing, but, as I say, it is wholly incomplete. (Applause.)

MR. JUDD. Did you ever experiment with asbestos?

PROFESSOR STUBENRAUCH. No. I think that would be rather expensive to use.

MR. JUDD. I don't think so. Where you buy it by the ton I don't think it will cost as much as cork.

PROFESSOR STUBENRAUCH. How about the weight?

MR. JUDD. It is very light.

PROFESSOR STUBENRAUCH. We are using the pith of Indian corn. I don't know how that is going to turn out. The last time I saw my storage lots they were in very excellent condition. We were able to keep that fruit in splendid shape for six weeks. We have learned something there, anyhow, and can use it in our shipping work, if for nothing else.

MR. SPRAGUE. So far, what appears to be the best grape to rival the Almeria?

PROFESSOR STUBENRAUCH. Our Tokay kept in splendid shape for about two months last year, packed in cork.

DR. SHERMAN. How late have you kept grapes?

PROFESSOR STUBENRAUCH. We had Tokays until Christmas time last year.

DR. SHERMAN. I had some a few years ago on cold storage in New York that lasted until the fifth of January.

PROFESSOR STUBENRAUCH. We had some lots that were in fairly good condition as late as the first of February. The holidays probably offer the best market.

DR. SHERMAN. How about redwood sawdust? Some man told me he had a method of sterilizing redwood dust.

PROFESSOR STUBENRAUCH. I would like to get on the trail of that man. I am using redwood sawdust this season. Its weight is against it.

DR. SHERMAN. How were those grapes handled where you found so many of them injured?

PROFESSOR STUBENRAUCH. Packed in the ordinary open crate.

DR. SHERMAN. Were they hauled from the vineyard?

PROFESSOR STUBENRAUCH. No, sir; they were packed on the ranch.

DR. SHERMAN. We have always made it a rule in picking to use hay in the box and then to put paper on, laying the paper on very carefully. We never allow a Jap or a Chinaman to handle them.

PROFESSOR STUBENRAUCH. I think that has a good deal to do with it.

DR. SHERMAN. Would it be practicable to destroy mold?

PROFESSOR STUBENRAUCH. I don't know. We have gone to the extreme in our handling operations and some of the bunches which were very closely packed with berries we cut apart in order to be sure to get out all the injured and unsound berries.

MR. JUDD. Do you find that soil conditions have anything to do with keeping qualities?

PROFESSOR STUBENRAUCH. We are studying that now in your own district, Mr. Judd. We are studying the influence of soil conditions on the keeping qualities of apples. There has been some trouble developed in the Watsonville apples which we have not found in apples from any other section. It seems to be something in the soil condition. Just what it is I do not know. There is no disease about it; the fruit simply does not keep as long as it ought to and turns brown inside. Some of your apples keep very well. I won't mention any names, but as far as we could determine last year in a preliminary way it seemed to indicate differences in soil. We had Professor Mackie make a survey and map of the Watsonville district this year and we have selected your four leading varieties and have gotten lots from the soil types and are storing them. Of course, it is too early to say anything about it this year.

DR. SHERMAN. What about the dipping of the stem of the grape?

PROFESSOR STUBENRAUCH. You mean in paraffine?

DR. SHERMAN. Yes, sir.

PROFESSOR STUBENRAUCH. We had no results from it whatever. In fact, it seemed to be a detriment because it made extra handling.

DR. SHERMAN. Are not all the Almerias treated that way?

PROFESSOR STUBENRAUCH. I do not think so. There is one thing about it. The variety seems to have a good deal to do with it and the condition of the stems. In some of the varieties the stems mold instead of drying. Shriveling of the stems does not necessarily mean the shriveling of the berries themselves.

THE CHAIRMAN. Mr. Butters is now here and we will listen to his paper on "Electric Roads for Developing Fruit-Growing." (Applause.)

ELECTRIC ROADS FOR DEVELOPING FRUIT-GROWING.

By H. A. BUTTERS, OF MARYSVILLE.

It could hardly be expected that any paper or remarks offered by me to this Convention could add to the sum of technical knowledge concerning the important and interesting industry the welfare of which it is the purpose of this gathering to promote. I make this confession, alas, in sorrow! In sorrow, I say, because to be a fruit-grower was once the dream of my fondest ambition. In the free fancy of my golden youth

there was a period when of all the brilliant array of pictures furnished by a fervid and fertile imagination the most entrancing were those which related to my plans for becoming a horticulturist.

Ah! what magnificent grapes, what luscious peaches, unrivaled pears, apricots unsurpassed by man, and record-breaking prunes! All these grew in the fields of my youthful pictures, as I lay stretched on a bed of verdure beneath the umbrageous spread of my own fig tree, breathing the perfume of millions of blossoms, and soothed by the low rustle of leaves that gently spread themselves to protect me from the sun.

It was all so beautiful and entrancing; and as I remember it now, so restful; in fact in my picture it was all rest; there was absolutely nothing doing except among the bees. They were always busy. In fact, on the fruit ranch of my dreams the only things which were busy were the bees; and my heart used to go out to them in pity whenever I dwelt upon their life of untiring industry with its insistent demands for activity, and I used to think, "Poor little bees, you have to work so hard I pity you. It is too bad you can not have an orchard, because then you would not be obliged to work."

Ah, ruthless irony of fate! Grim realization, the destroyer of ideals; I have since had a *real* orchard; and contact and time stripped it of romance and lay bare its wayward and contrary disposition and its predilection for all the diseases in the horticultural category; revealing the bugs and things hidden within its inmost recesses, not to mention the vagaries of the market, eccentricities of the commission merchant, and the peculiarities of a railway tariff. One after another, in a solemn and insistent procession, these evil things presented themselves to me to be dealt with by my inexperienced mind. But I grappled with them with all the optimism of youth, making mistake after mistake, until that train of strange and unintelligible conditions overwhelmed me and I saw with tears my beautiful air castle in ruins.

I think that about the last straw which broke my back was the discovery that some trees which the nurseryman had labeled early apricots and sold to me as such, turned out to be very late seedling peaches, and sour at that.

All this happened many years ago, and I was thereby forced to try some means of obtaining a livelihood not connected with the chosen vocation of my youthful dreams.

Those early memories, however, are very dear to me and are fresh in my mind, even at this late day, and I have recently acquired an interest in some orchards near Chico. Profiting, however, by my early experience, I decided to hedge on that investment by having an interest in some one of the various things which seemed to me in my early experience to have me so much at their mercy, and so I started the Northern Electric Railway.

The philosophy of the occultists and theosophists teaches that in each incarnation there is something either of good or of evil, generally both, coming to each individual, and the votaries of those teachings call that something Ego. Well, by the intensity of my leanings toward horticulture, it seems that in my Ego there must be some good coming to me out of that business, and as my early experiments with production were so disheartening it has occurred to me that whatever of good is in my Ego connected with horticulture may be in the transportation of the products, and so I am now demonstrating along that line.

To be entirely serious, however, for the moment, we are now touching upon a subject of most vital interest to the industry and, as I look around upon the thousands of acres in this fine valley so admirably adapted to the purposes of the fruit-grower, I can not help being impressed with the part that is to be done by the electric railway in the great development which is to take place in this valley, and the importance to the local growers of having this local line here to cooperate with them.

While giving to transcontinental lines their just due, and while they are of immense importance to the whole State, yet it is as they stand in their relation to the whole State, and not so much to particular localities, that their importance is to be considered. It is to the local line that we must look for those particular facilities which are to count as most potent factors in local development. A transcontinental line, strung out, for instance, from the Great Lakes to the Pacific, has many and varied interests to consider and does not, because it can not, concentrate upon any one locality, while the local line must concentrate all its efforts on its locality. It makes very little difference to a local line in the Sacramento Valley how much freight or passenger business originates in Reno or Los Angeles, which are questions of the greatest importance to the transcontinental lines and must be considered even though they affect the local line unfavorably. But the local line must understand all about the business originating in and for its locality, because that is the vital issue of its existence, and being the vital issue of its existence it must be fostered and nursed and extended to the utmost, because out of its locality, and there only, must the local line produce the only revenue possible for it to obtain; and consequently it must, and will, pay greater heed to the needs of the community, and therein it is the ally of the producer. By working in smaller units it is possible to give more frequent and more rapid service, a service most suited to such a locality as ours; and without being invidious at all, I say frankly, because the Northern Electric Railway is a local line and because it must get its revenue locally only and can get none from any other source, it should have all the local business in the section through which it operates; and if the people of

this valley really had a realization of what the welfare of that company means to them, no other railway in this section would receive a dollar from the local business.

It is a well-known fact that the transportation problem in the Sacramento Valley has vexed the people more than any other, except perhaps that relating to drainage. They have needed better facilities than those existing up to date, and they are beginning to materialize. We have made a good beginning, and only a beginning. Our service, both freight and passenger, is not at all what we wish or intend it to be, but we confidently expect that within a reasonable time it may be much improved. I am not so optimistic as to suppose that the service we or any other railway company can give will be entirely satisfactory to the public, because it is the privilege of the public not to be satisfied with the performance of a public utility company, and they generally exercise that privilege pretty freely; nevertheless, we shall do the best we can and that will be better than anything we now offer. Our main difficulty lies in finding good men. Since our line opened in September we have hired something over three hundred men in our operating department and discharged fully two hundred and fifty for inefficiency. We are gradually getting a good force, however, and when we are finally organized most of the present inadequacies will disappear. We have some fine men in our service, as good as there are in the Union, and these have operated right along with the incapables without trouble or accident.

There is one thing that comforts me in the many troubles I have had in connection with this railway, and those troubles are legion. I refer to the absolute knowledge that none of those nuisances that made my life as an orchardist so miserable are connected with a railway. Railways don't have codling-moth, nor pear blight, nor scale; and I think most of you will agree with me when I say that any business that is free from those pests need not be considered hopeless.

We are sailing now in troublous waters at the mercy of adverse winds, and are suffering from the same troubles that are affecting the whole business community owing to the scarcity of money; but please bear in mind that the Northern Electric Railway once built is bound to remain an important factor in the community. Men may come and men may go, but the railway will continue doing business at the old stand and must now be considered in all plans connected with the country; its integrity will not be obliterated; and although circumstances might arise to curtail its extension for the present, ultimately its mission will be to branch out in all directions, affording facilities for interchange of help, for shipment of merchandise and products to and fro, and performing all the great public functions of a servant of the people. When these extensions are all completed, the conveniences

afforded will induce a greater population and more intense cultivation, which will in turn bring about a corresponding development in drying, packing and canning, and therefore greater facilities for marketing the products.

Between this city and the town of Biggs on the north, a distance of twenty-three miles along the line of the Northern Electric Railway, taking a strip one and one-half miles wide on each side of the track, there are about fifty thousand acres of land in every way adapted to the culture of fruit, and upon which there is already a large acreage under production, and this production has been going on for a long term of years and has resulted in a demonstration of the adaptability of this soil and climate to the purposes we are now considering, which removes it entirely from the realm of uncertainty, and leaves nothing for the imagination in connection with what would be the given result of an investment of time and labor upon any of these lands.

It is not the purpose of this paper to go into the figures of production, as they have been more ably dealt with by others who are more familiar with that subject, but the above facts are mentioned simply to bring vividly before you a picture of what can be accomplished in this immediate section alone, provided the available resources were put to practical purposes. The value of an electric railway to this belt of land can hardly be overstated. I believe that it is generally conceded that it is of very great advantage for a grower to be able to market as much green fruit as possible, and our railway in this section would enable every fruit-grower upon that entire strip of land to market his fresh products so far as the local railway facilities are concerned. The hauling from any of the lands within that belt to such a railway would not be serious and would not result in damage either by the wear and tear of wagon transportation or by delays incident thereto. This is particularly true of an electric railway, because one of the chief advantages of such a railway is the facility with which it can operate small units frequently. Under a system of electric railway which is properly equipped with cars, a frequent service would be quite practical, so that fruit could be loaded and moved expeditiously and it need not be subjected to delays incident to a system which operates perhaps one long, cumbersome freight train per day in which there is a great deal of switching and banging about. It is obviously advantageous, for instance, in hot weather, if a fruit-grower can load a car quickly and have it moved to its destination without having it exposed too many hours in the heat; this can be brought about only by such a system as an electric railway would establish.

To refer again to the belt of land between this point and Biggs, and which you will all agree with me is just being hardly more than touched at present. I am told by well-informed persons that the whole

section of country is as admirably adapted for the culture of citrus fruits as is the land at Palermo and Oroville, and to give you an idea of what could be accomplished there I will state that last year from two thousand acres of orange orchard at Palermo there were 300 cars of oranges shipped. The value of these cars will average about \$600, take it good and bad years, which would give a gross value of \$180,000 for two thousand acres of land, or \$90 per acre. Now we all know that the Palermo and Oroville orange business is conducted in more or less of a large way, and that yields are not generally so great from farming operations that are conducted upon a large scale as they are from the smaller farms, because the man who has twenty acres³⁰ less does a great deal of his work himself and gives to his trees and to his land that particular personal touch which is not embraced in the service which is given by hired help, and it is safe to say that with these two thousand acres in the hands of two hundred holders the products would be a great deal larger.

I understand also that the value of the Thompson Seedless grape is much in excess of these figures which I have quoted from the citrus belt. I can not be considered authority upon this subject, however, and simply make the statement in relation to the oranges, because this culture is very attractive to many Eastern people; it is a fine advertising feature for a country, and I do not think that the people in this vicinity give quite enough prominence to it. I do not think that they quite realize the value of the citrus feature, or they would make more of it in their advertising.

The Northern Electric Company has recently put in a siding at Thermalito and we have hauled away a great many cars of oranges this year that have heretofore had to be delivered in wagons to the Southern Pacific station several miles away, and manifestly it has made a considerable saving to the grower. I do not sight this particular section which I have mentioned, between here and Biggs, with idea of accentuating it in any way to the detriment of any of the other sections of the Sacramento Valley, all of which are equally as advantageous and equally as extensive. The acreage is sufficiently vast to dazzle one's imagination and it is difficult to realize what the ultimate destiny of this valley will be when all of these broad acres are brought as they will be, under the guiding hand of intelligent growers. It is the aim of the Northern Electric Company at present to keep pace with the development that is going to take place in these various sections, and as rapidly as we can obtain the money, to build the requisite branches in order that the people may get the full benefit of the facilities which can be afforded by man for the transportation of the products. This fact alone should give to this section of the country a tremendous fillip and be a great incentive to the inauguration

new industries in horticulture; because nowhere in the State of California, outside of the vicinity of Los Angeles, will there be such facilities for transportation of passengers and freight as will be afforded in the Sacramento Valley when our extensive plans are carried to materialization.

Nearly every one in the Sacramento Valley concedes that a complete revolution of conditions and values has taken place since the Northern Electric Railway was established. This is true of all regions where electric traction enters in, and the change in the conditions which you have seen in the last twelve months is but a beginning of the new era upon which the Sacramento Valley is entering and which will be an era of change, evolution, development, and consequently progress, to such an extent that in a few years those who have lived here under past conditions will look upon those past conditions almost as a dream, and it would be hard to realize that they ever existed in the country; and this brings us to the point as to what is the exact value of these facilities to the fruit-grower, and that is a point which only the fruit-grower himself can determine, and in this connection I would like to point out the two chief factors for your consideration upon this subject:

First—It is manifest that the haul to the chief transcontinental points can be made much more cheaply by electric railway than by team.

Second—A great deal of fruit that could not be hauled to any destination by wagon can be easily transported by electric railway, and this last advantage would enable the grower to market a very much larger proportion of green fruit than it is possible for him to do without these facilities.

These two points must give very material added value to every acre of land which can be served by such a system, and that added value, whatever it may be, must be considered as an increase on every acre of land which is affected, and thereby the owner of these lands is directly benefited to an appreciable extent, the value of which every grower himself can estimate, and these advantages are entirely exclusive of realities which are embraced in the usual estimate of benefits afforded by such a system.

MR. JUDD. Mr. Butters, isn't it a fact that the electric railroads in the East, especially in the agricultural sections, have been almost the redemption of a good many of those New England and Middle States?

MR. BUTTERS. Yes, sir.

MR. JUDD. In Bulletin 44 of the U. S. Department of Agriculture, regarding to the rise and fall of values in the United States, the only bright spot in the bulletin was where electric lines were run through a portion of country, thereby increasing the value of the lands.

MR. BUTTERS. That is very easily illustrated by Sacramento. I know two or three bankers in Sacramento who have large ranches between Marysville and Sacramento. These gentlemen have been in the habit of heretofore taking a day off. They used to drive out twenty-five or thirty miles on a hot day, and take all the forenoon to drive, and they were gone a day and a half or two days. Now, after banking hours, they jump on the electric cars and come out and transact their business and go back again. When this system of railways is finished as we plan it, you can take an electric car and go anywhere you please. You can't realize how much the conditions will change. In sections of the East where the boys have left and gone to the cities and the old folks live alone, the electric roads have gone through and those farms have all come back into prominence and the old values are being restored and, in fact, more.

MR. JUDD. The reason I asked the question was because I thought that in your paper you did not sufficiently drive home the fact that the salvation of California, all over the State, is in the getting and maintaining of electric lines, because transportation is much cheaper over electric than over other lines. We had that experience in Watsonville. It was a godsend as long as it lasted. Well; they fell in among thieves—I think that is what they call it—and they sold the road to parties who are not congenial, and it is not running.

MR. MILLS. Do you intend to reach out to the large market around the bay, Mr. Butters?

MR. BUTTERS. So far as our own personal, individual plans are concerned, I can not perhaps talk quite as freely about that as I would like to, but I can say this, that already there are two or three surveys from Sacramento to Vallejo and other points on the bay—Tiburon and Vallejo. The actual outcome of this whole business will be that an electric line will be extended—in fact, I have reason to believe that had not this money stringency come on work would have been commenced on a line between Sacramento and Tiburon which would have enabled the Northern Electric to make a traffic arrangement to put all its traffic through as far as Tiburon, and reaching the bay it would have been easy to get water transportation to San José or any other point. There is no doubt that that is the ultimate outcome—that there will be a trunk line from the northern part of California to San Francisco; that it will run down the west side of the river; that the products will come in from Woodland, Vacaville, Suisun, Napa, Petaluma, and that whole country, and they will all feed the electric railway. Of course, we have personally no such project as that, as we have got enough to do in the Sacramento Valley. In fact, we have laid out a system here covering several hundred miles and not covering the entire valley. We have covered 360 miles and that is all in the Sacramento Valley north of Sacramento.

MR. MILLS. One need not have a very vivid imagination to see the wonderful happiness that will come to a people thus served.

MR. BUTTERS. I think you will find that it will revolutionize the conditions there.

MR. MILLS. I move that the paper be accepted, placed on file and printed in the bulletin.

The motion was duly seconded and carried.

MR. JUDD. I wish to make a motion that this Convention pass a vote of thanks to Professor Stubenrauch and Professor Mackie and Mr. Mason, and to ask them to have papers on those subjects at our coming convention.

The motion was duly seconded and carried.

MR. MILLS. There is one thing I would like to mention, and that is this, that this Convention recognizes the splendid work that has been done by our State University authorities, in connection with the fruit industries of this State, in the pathological stations and the experiment stations. We want to appreciate that they are doing a very great work for us. I can mention one thing, where Professor Smith, who was here, has solved a very great difficulty for some of the fruit industries in that brown rot. By a very skillful examination of that question he has solved it and saved us many tens of thousands of dollars; and in the stations all over the north and south they are solving very many such questions; and I wish to place on record, and that this association will allow me to do, the good work that has been done by the Federal government and by the State through the University. I move that we recognize this good work by both the Federal and State authorities.

The motion was duly seconded and carried.

On motion of Mr. Judd, duly seconded, the Convention adjourned *sine die*.

J. W. JEFFREY, President.

JOHN ISAAC, Secretary.

